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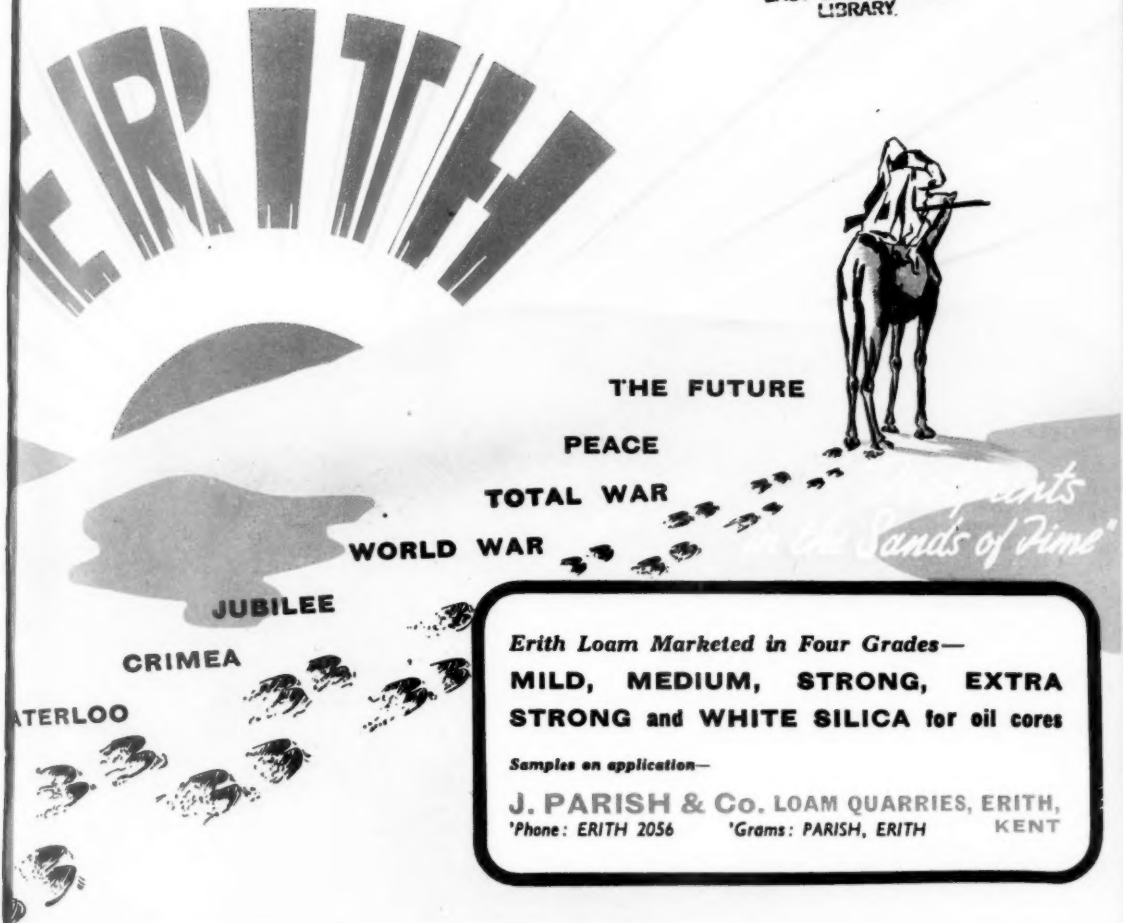

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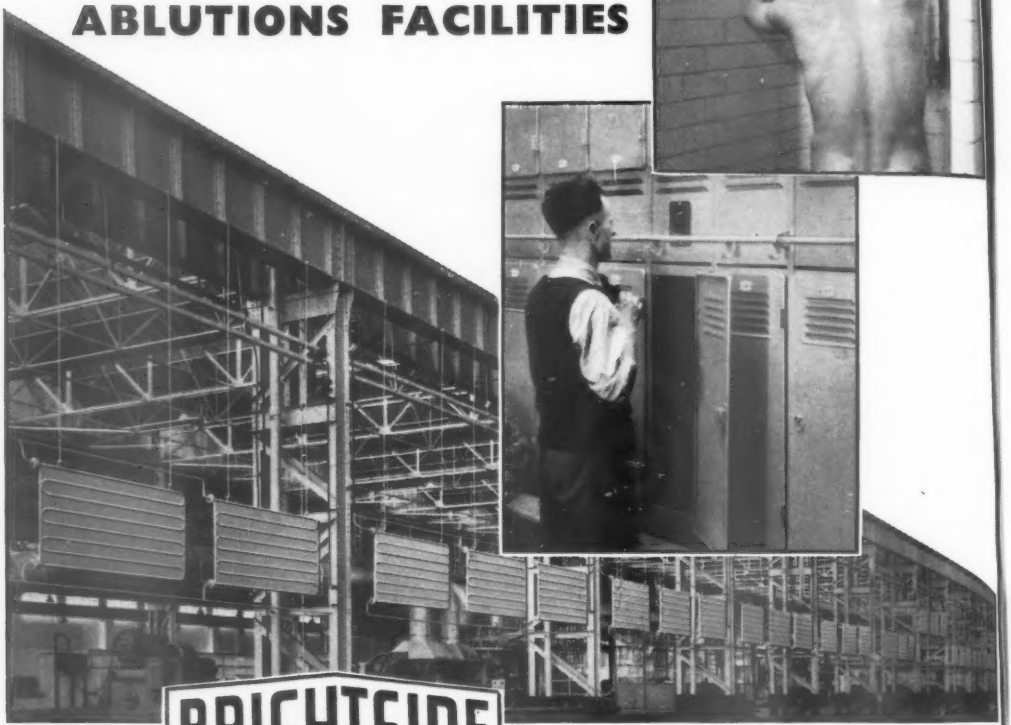

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A Burning Question

From the newspapers of last week, we have culled three items:—A letter to *The Times* from Mr. P. L. Goodchild pointed out the whole of the value of the export of motor-cars was neutralized by the cost of imported coal; labour disputes in the coal-mining monopoly cost the country £17,500,000 when related to the price of coal imported to make up that lost as a result of stoppages and, finally, the chairman of the Cheshire County Education committee announced that coal-burning installations in the schools under its jurisdiction were to be replaced by oil-fired appliances. There must have been many other news items of a similar character, the cumulative effect of which must eventually lead the man in the street to lose faith in solid-fuel and look for alternatives.

One of the most popular alternatives is fuel oil. It has already established itself as the fuel for the steel industry, for the heating of new public buildings and blocks of offices. The next obvious step is for its adoption in the home—we understand there is no difficulty about delivery of consignments of oil equivalent to a ton of coal. In changing to oil, the installation of a suitable tank is necessary, which costs money, but then, so does a coal bunker. So many people are toying with the idea, that we counsel founders making domestic heating and cooking apparatus to think earnestly around the question, and—if the demand for oil-fired apparatus becomes insistent—to have plans prepared to meet it.

With the increased use of electric lighting, the glamour of the old-fashioned open fire in the home is fast losing its popularity and economy of fuel and thermal efficiency are being urged upon householders. Manufacturers have well responded to this demand and are now producing domestic heating apparatus showing outstanding improvement. If solid fuel ever became cheaper and more easily procurable, the founders would adequately cater for modern requirements. What we fear, however, is that because of the price and poor quality of coal, the difficulty in securing deliveries, and the campaign for clean air, and dust-free atmospheres, pressure of public opinion is increasing against the continued use of solid fuel. This may result in the greater availability of coal and coke for industry, and eventually in lower prices, through competition. Every piece of apparatus installed, which burns fuel other than coal, is a step in this direction and the makers of domestic heating and cooking apparatus must prepare for the coming demand. At the Building Exhibition, currently being held at Olympia, London, one stand shows half-a-dozen well-known types of central-heating boilers, most, but not all, of which have been redesigned to use oil fuel. The converted ones are not really efficient, and current opinion is that a complete redesign is called for.

IBF Student's Grant

During recent years, the Institute of British Foundrymen, as part of a scheme to widen its educational work, with the generous co-operation of the Joint Iron Council, has made an award which enabled a deserving young foundryman, whose aspirations would otherwise have failed to materialize, to bear the cost of a course at the National Foundry College. Two years ago the Joint Iron Council kindly decided to accept direct responsibility for granting this award which, however, continues to be made through the medium of the Institute of British Foundrymen, the latter being responsible for judging the entries.

The Institute is therefore prepared to receive applications for the 1956 award from young foundrymen or students preparing for work within the foundry industry. In general the award will be confined to applicants under 30 years of age, and it is primarily intended for those who wish to take a course at the National Foundry College, though in very exceptional circumstances consideration will be given to render assistance for some other form of study. Applicants should be of the educational standard necessary to secure admission to the National Foundry College. Applications from candidates for the award should contain the following information: (*a*) Name, address and age; (*b*) name and address of present employer; chronological accounts (*c*) of previous experience; and (*d*) of educational qualifications and technical studies; (*e*) full particulars of any investigational work carried out; and (*f*) whether the applicant has applied to any other body for assistance.

It will be the endeavour of the Institute to secure the co-operation of the selected candidate's employers in ensuring him continuity of employment. Applications should be addressed to the secretary of the Institute and submitted not later than March 31, 1956.

Dinner

FEDERATION OF LIGHT METAL SMELTERS

The tenth annual dinner of the Federation of Light Metal Smelters was held at the Trocadero last Thursday. Mr. O. G. Halliwell presided. With him at the high table were Mr. D. W. G. L. Haviland, Under Secretary Air Division (A), Ministry of Supply, who proposed the toast of the Federation; Mr. B. Endlar and Mr. G. T. Whitehouse, who respectively proposed and replied for "The Guests"; Mr. W. Brown, Dr. H. W. Clarke; Mr. V. P. Harries; Mr. W. T. Horsley; Mr. L. Lazarus; Mr. Murray Shaw and Mr. T. M. Wilson, many of whom were accompanied by their ladies. The company was entertained by Gwen Catley (soprano) and Wally Fryer and Violet Barnes (ballroom dancers). The function was, as always, excellently organized by Mr. H. Y. Ross, the secretary.

Luncheon

LIGHT METAL FOUNDERS' ASSOCIATION

The Minister of Supply, the Rt. Hon. Reginald Maudling, M.P., was the chief guest at the first full-scale luncheon party organized by the Association. It was held at the Savoy Hotel last Thursday, under the chairmanship of Mr. W. Brown. With him at the high table were Mr. E. Player, who proposed the toast of Her Majesty's Ministers; Mr. E. C. Bowyer, C.B.E.; Mr. Fraser W. Brice; Mr. L. R. Carr, M.P.; Dr. H. W. Clarke; Mr. L. Fletcher; Mr. D. W. G. L. Haviland; Mr. G. W. Lacey; Mr. J. C. Milner; Mr. J. F. Paige; and Mr. Manoel B. de Sousa Pernes.

C & G "Foundry" Prizes

The following prizes offered on behalf of the Institute of British Foundrymen were awarded to successful candidates in the City & Guilds of London Institute examinations on foundry practice and patternmaking in the year 1955:—

Buchanan Silver Medal:

Foundry Practice, final:—Rex Frank Cornell, Braintree.

Buchanan Prizes:

Patternmaking, final:—Anthony Ernest Young, Braintree; Maurice Arthur Smith, Reading. Foundry Practice, final:—William Henry Casling, Heston, Middlesex.

P. H. Wilson Prizes (established by the late P. H. Wilson, O.B.E., past-president, for successes in the intermediate examinations) were awarded to:—

Patternmaking, first prize:—Eric Prescott, College of Technology, Birmingham; second prizes:—Malcolm Sagar, Pudsey Technical Institute; George Skiffington, School of Engineering, Hamilton.

Foundry Practice, first prize: Jack Shields, Constantine Technical College, Middlesbrough; and second prize:—Clifford Pashley, Sheffield College of Commerce and Technology.

President-elect

At the annual general meeting of the Iron and Steel Institute, on November 16, Dr. H. H. Burton was nominated for election as president to take office at next year's annual meeting. After the formation of the English Steel Corporation, Limited, in 1929, Dr. Burton was appointed senior assistant to the late Mr. J. H. S. Dickenson, and succeeded him as chief metallurgist upon his death in 1934. Appointed a special director of the corporation in 1938, and a director in 1943, Dr. Burton is also a director of Firth-Vickers Stainless Steels, Limited, the English Steel Forge & Engineering Corporation, Limited, Darlington Forge, Limited, and Industrial Steels, Limited.

Dr. Burton was elected a member of the Iron and Steel Institute in 1935. He became a member of Council in 1944 and was elected a vice-president of the Institute in 1947.

Opportunity from Power Demands

Demand for electrical energy in all countries had tended to double itself every 10 years and the belief that this would happen in the next decade was expressed by Lord Chandos, the president, at the annual dinner of the British Electrical and Allied Manufacturers' Association on November 16. With the present shortage of manpower and the growth of electronics there would be a great increase in the replacement of manual effort by electricity. These factors afforded manufacturers a steadily expanding market, said the president.

But at the same time the Minister of State, Board of Trade, Mr. A. R. W. Low, warned that competitors in the expanding world market were taking a larger share. Britain's share was falling—if only by a small amount—and it seemed, too, that competitors were encroaching on the British traditional markets. He emphasized that we could not be complacent about the trend of costs.

BRITISH FOUNDRY UNITS, LIMITED, Retort Works, Chesterfield, have submitted plans for the erection of a second storey to their existing premises.

Observation and Control of Dust on a Pneumatic Chisel, Portable Abrasive Wheel and Bench Grinder*

*By W. B. Lawrie, M.B.E., M.Sc.,† A. T. Holman, O.B.E., M.I.Mech.E.,‡ and E. B. James.***

This Paper describes a new method of local exhaust ventilation which employs very low air volumes at very high velocities. The system has been experimentally used to control dust from a pneumatic chisel, a portable grinder and a bench grinder. The air volumes used on these tools vary from 4 to 40 cub. ft. of free air per min. which is induced at a vacuum of 3 to 12 in. of mercury, and the calculated velocity of the exhaust air in the ducts is of the order of 12,000 ft. per min. The low air volume allows the use of small ducts which vary in diameter from ¼ to 1 in. The main effort was directed to the control of dust within the respirable size range, and so the systems have been developed on careful observations of the paths taken by the airborne dust-clouds produced by the three tools. These dust clouds have been photographed by means of a 35-mm. cine camera, and the Paper includes "still" photographs taken from the film negative.

In the case of the pneumatic chisel, the dust is controlled by means of local exhaust ventilation applied through a hollow chisel, the dust being extracted through the pneumatic hammer itself. Dust control has been applied for the first time to the portable grinder by means of a peripheral duct fitted into the wheel guard, and the system has been adapted for an 8-in. dia. bench grinder which is used to grind tools and small articles. The prototypes have been tested in laboratory conditions and each has given a high standard of dust control in the conditions imposed during the tests.

Pneumatic Chisel

It is well known that the pneumatic chisel produces dangerous dust-clouds in certain circumstances, and while small work may be done on a bench fitted with local exhaust ventilation, there are many occasions on which the chisel has been used without any kind of dust control. This is largely because no successful dust-control system has been fitted as an integral part of the chisel, and it was for this reason that the present work[1] was done. Two of the Authors[2] had designed a hollow rock-drill for use in mines. In this machine the dust was successfully extracted[3] through a hollow drill steel, and removed through the pneumatic hammer. One of the Authors[4] had previously shown that fine dust of the respirable size range moved up the pneumatic chisel and passed along the operator's arm as it rose to his face.[5] It appeared, therefore, that the dust-control system used on the rock drill could be applied to pneumatic chisels.

Eductor.

A Holman Eductor (see Fig. 1) was used to induce the necessary air-flow throughout the experimental work, although a rotary exhauster can be used equally well. The Eductor is an annular air ejector operated from a compressed-air line. In mining practice, the ejector is used with a static vacuum of 13 to 15 in. of mercury, which gives a running vacuum of about 10 in. of mercury. For the present work on the chisel, the ejector was modified to give a running vacuum of about 12 to 15 in. of mercury, when it induced about 25 cub. ft. of free air per min. The flexible hose by which the Eductor was connected to the chisel was ⅜-in. dia., and this gave a calculated air velocity of about 12,000 ft. per min. in the hose. Each chisel exhausted about 4 cub. ft. of air per min.

Chisel Design

The earliest work was done on a standard chisel, the exhaust being applied through a fish-tail nozzle held manually over the chisel point. When this had resulted in a good measure of dust control, it was decided to proceed with the design of a hollow chisel, and the pneumatic hammer was fitted with an annular piston and suitably modified so that the dust could be extracted through a duct along the centre line of the machine. Fig. 2 shows the arrangement of the ports in the chisels.

Dust Observations

The measure of dust control achieved is indicated by the "still" photographs taken from the 35-mm. cinematograph film. Chips of metal can be seen leaving the chisel point but the fine dust appears to be under good control. Fig. 3 shows the dust produced by the use of a pneumatic chisel without any form of dust control. Fig. 4 shows the external local-exhaust ventilation hose fitted with a fishtail. This was lowered by hand down the chisel shank, and dust can be seen in the photograph as it flows into the fishtail. This was thought successful enough to design the hollow chisel which can be seen working in Fig. 5. The dust is flowing into the ports in the chisel and the large particles can be seen as they are

* Paper presented to the London branch of the Institute of British Foundrymen. The Authors are respectively †H.M. Engineering Inspector of Factories; ‡director and **research engineer, Holman Bros., Limited, Camborne, Cornwall.

Observation and Control of Dust

projected away from the tool. The Eductor was working at a vacuum of 10 in. of mercury when this photograph was taken.

Dust Estimations

A short series of dust counts which were taken in laboratory conditions are given in Tables I to III. Counts are taken with the Owen's jet counter, the Konimeter and the Thermal Precipitator. The samples were not incinerated. The dust counts were taken while the chisel was operating on small iron castings. The work was done in a laboratory, with only one chisel in use so that no attempt could be made to assess the " build-up " over a period of time equivalent to a working day. It was for this reason that samples were taken first over the chisel point where it was known that the dust cloud would be denser than at any other point in the atmosphere. Samples were also taken at the breathing level of the operator in an effort to estimate the increase of dust concentration during the period that the chisel was in use.

TABLE I.—*Dust Estimations on the Pneumatic Chisel, using Owen's Jet Samples.*

Sample No.	Particles per ml.	Remarks.
1	200	General atmosphere before start
2	400	With exhaust: At chisel point—working 2 min.
3	500	With exhaust: Breathing level—working 6 min.
7	1,200	Without exhaust: At chisel point—working 2 min.
8	1,800	Without Exhaust: Breathing level—working 2 min.
9	2,700	Without exhaust: Breathing level—working 7 min.

TABLE II.—*Dust Estimations on the Pneumatic Chisel (Konimeter Samples).*

Sample No.	Particles per ml.	Remarks.
2	No recognisable spot	General atmosphere before start
3	46	With exhaust: At chisel point—working 2 min.
4	52	With exhaust: Breathing level—working 6 min.
9	Too many to count	Without exhaust: At chisel point—working 2 min.
10	388	Without exhaust: Breathing level—working 2 min.
11	Too many to count	Without exhaust: Breathing level—working 7 min.

TABLE III.—*Dust Estimations on the Pneumatic Chisel from Thermal Precipitator Samples.*

Sample No.	Particles per ml.	Remarks.
1	139	General atmosphere before start
2	119	General atmosphere before start
3	307	With exhaust: At chisel point
4	435	With exhaust: At chisel point
5	140	With exhaust: General atmosphere sampled continuously during Nos. 3 and 4
6	948	Without exhaust: At chisel point (cp. 3 and 4)
7	188	Without exhaust: General atmosphere, sampled simultaneously with No. 6
8	1,707	Without exhaust: At chisel point (cp. 3 and 4)
9	326	Without exhaust: General atmosphere, sampled simultaneously with No. 8

cp. = collection position.

The Owen's jet samples were estimated by the method previously described[6] and the results are given in Table I. Starting with a dust concentration in the general atmosphere of 200 particles per ml. six minute's work with exhaust on the chisel gave a breathing concentration of 500 particles per ml. as opposed to 2,700 particles per ml. produced by seven minutes' work without exhaust.

The Konimeter showed no recognizable spot on the general atmosphere before starting. Six minutes' work with exhaust on the chisel increased this to 52 particles per ml., while seven minutes' work without exhaust produced a spot showing too many particles to count.

The Thermal Precipitator gave similar results. The general atmosphere before the commencement of work showed 119/139 particles per ml. sampled at the breathing level. This remained steady at 140 particles per ml. when working with exhaust, but rose to 326 particles per ml. when working without exhaust. The samples taken over the chisel point show a greater divergence as they were taken in the main dust-cloud. Here the chisel with exhaust gave 307/435 particles per ml. as against 948/1707 particles per ml. from the chisel without exhaust.

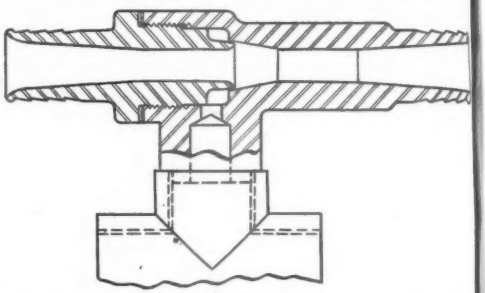

FIG. 1.—*General arrangement of the Holman Eductor.*

Portable Abrasive Wheel

Local exhaust-ventilation has also been applied for the first time as an integral part of a portable abrasive wheel. In the past, local exhaust-ventilation has only been used on portable grinders when the work could be placed on an exhausted table or in a booth. This was not always done, even in cases where it might have been, but even where it was done there still remained a wide range of work that could not be dealt with in this fashion. The present work[1] was done, therefore, in an attempt to provide a dust-control system which could be used whenever the machine was used.

Eductor

During the experimental work, the vacuum was obtained by the use of an eductor (see Fig. 1).

This compressed-air ejector was coupled to the wheel hood by means of a $\frac{4}{5}$-in. dia. flexible hose through which the dust was extracted from the machine. With a vacuum of 6 in. of mercury the ejector induced 23.5 cub. ft. of free air per min. through the duct in the wheel hood. This air moved along the flexible hose with a calculated velocity of 11,500 ft. per min. The compressed-air ejector was used as a matter of convenience during the experimental work, but a rotary exhauster could be used equally well.

Hood Design

The new system was fitted to a portable grinder using a 6-in. dia. wheel, running at a free speed of 6,000 revolutions per min. with a peripheral speed of 9,000 ft. per min. The wheel hood was made with a double-walled periphery so that the curved edge of the hood became a duct. This hood is

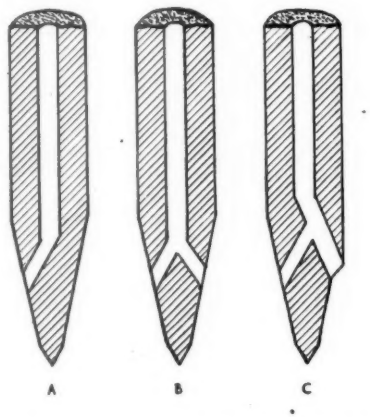

FIG. 2.—*Arrangement of the duct and inlet ports in the hollow chisels.*

shown in Fig. 6, from which it will be seen that the inner surface of the peripheral duct was fitted with three ports, through which the exhaust air and the dust, were extracted.

Dust Observations

The whole of the work was based on dust observations which were recorded on a 35-mm. cinematograph film. Fig. 7, which is taken from earlier work[5] shows the path of the dust cloud when using a portable grinder without exhaust ventilation. Fig. 8 is a "still" photograph taken from the film which was used during the development of the present dust-control system. This photograph illustrates the measure of dust control achieved by the prototype when grinding grey iron.

Dust Estimations

Dust counts were taken on the completed machine by means of the Owen's jet counter, the Konimeter and the Thermal Precipitator. During these tests, the machine was used to grind grey iron, and the results are given in Tables IV to VI.

TABLE IV.—*Dust Estimations on the Portable Abrasive Wheel, Employing Owen's Jet Samples.*

Sample No.	Particles per ml.	Remarks.
1	200	General atmosphere before start
4	200	With exhaust: 12 in. from wheel—working 2 min.
5	600	With exhaust: 18 in. from wheel—working 2 min.
6	300	With exhaust: Breathing level—working 7 min.
10	4,000	Without exhaust: 12 in. from wheel—working 2 min.
11	10,000	Without exhaust: Breathing level—working 7 min.
12	8,000	Without exhaust: General atmosphere at end of test

TABLE V.—*Portable Abrasive Wheel (Konimeter Samples).*

Sample No.	Particles per ml.	Remarks.
2	No recognizable spot	General atmosphere before start.
6	189	With exhaust: 18 in. from wheel—working 2 min.
7	120	With exhaust: Breathing level—working 7 min.
8	78	With exhaust: Breathing level—working 8 min.
12	Too many to count	Without exhaust: 12 in. from wheel—working 2 min.
13	Too many to count	Without exhaust: Breathing level—working 7 min.
14	Too many to count	Without exhaust: General atmosphere at end of test.

TABLE VI.—*Dust Estimations on the Portable Abrasive Wheel using Thermal Precipitator Samples*

Sample No.	Particles per ml.	Remarks.
1	139	General atmosphere before start.
2	119	General atmosphere before start.
13	243	With exhaust: Breathing level.
15	3,278	Without exhaust: Breathing level.

The machine was used under laboratory conditions and was worked only for the relatively short period of time needed to complete the tests. The Owen's jet showed that the general atmosphere dust-concentration was 200 particles per ml. before commencing work. This increased to 300 particles per ml. at the breathing level of the operator after 7 minutes' grinding with the exhaust system working. Without the exhaust system, 7 minutes' grinding produced a dust concentration of 10,000 particles per ml.

Comparable results were obtained with the Konimeter. This instrument produced no recognizable spot from the general atmosphere before starting work. After grinding from 7 to 8 minutes, with the exhaust system working, the breathing level dust-concentration rose to 78 to 120 particles per ml. A similar grinding period without exhaust gave a sample containing too many dust particles to count.

FIG. 3.—*Pneumatic chisel working on a rough cast surface with no exhaust*

FIG. 4.—*Using a pneumatic chisel with dust control by fishtail over the chisel point.*

The dust concentration in the atmosphere before starting was 139 particles per ml. on the Thermal Precipitator. With the exhaust system working, the breathing level rose to 243 particles per ml., and the same grinding period without exhaust produced 3,278 particles per ml. at the breathing level of the operator.

Bench Grinder

The successful application of the new dust-control system to a portable grinder led the Authors to consider the problem presented by stand grinders, where it was obvious that the use of low volumes of controlling air would offer definite advantages in practice. Because the work had been done on a 6-in. dia. portable grinder, it was decided to start with a stand grinder of similar size, and the early development work was done on a series 40 Holman grinder with a wheel dia. of 6 in., a free running speed of 6,000 r.p.m., and a peripheral velocity of 9,000 ft. per min. At a later stage, the results were adapted to an 8-in. dia. wheel. The machine, which is seen in Fig. 9, was mounted in a stand and bolted to the bench. A work rest was fitted so that the machine became a normal bench-type grinder for use on tools and small work. The original conception was that a simple adaptation of the system developed for the portable grinder would suffice to control the dust. Early experiments, however, indicated that this method was not particularly effective in the conditions of the stand grinder, and dust leaked from the hood at the sides and top of the wheel. In consequence, the aerodynamics of the system were carefully explored.

Eductor

The Eductor was modified, as a first step, in order to give a larger volume of induced air. Apart from this alteration, which gave a volume of about 40 cub. ft. per min. at 3 to 5 in. of mercury, the compressed-air ejector was similar to that used on the two machines described earlier in the Paper.

Hood Design

The first hood was designed as shown in Fig. 6, a single port being placed in the leading edge of the peripheral duct, immediately below the work rest, at A in Fig. 10. The air ejector was then connected to the guard by a $\frac{5}{8}$-in. dia. pipe through which the dust and the exhaust air were extracted. Air-velocity measurements were taken with a Metropolitan Vickers Velometer, and the air distribution resulting from the rotation of the wheel and the application of a vacuum of 5 in. mercury is given in Fig. 10 and Table VII. During this part of the work, the leading edge port was moved progressively further away from the underside of the workrest. Tests were done with this port in the three positions, A, B and C.

TABLE VII.—*Air Velocities when Employing a Vacuum of 5 in. of Mercury.*

Position.	Ft. per min.	Remarks.
1	1,200	No work on rest.
2	1,100	No work on rest.
3	2,400	No work on rest.
4	2,100	No work on rest.
5	1,000	Work on rest. Velocity outwards.

Dust observations and photography confirmed the inference from Table VII that dust would leave the guard opening at the top of the wheel (*i.e.*, the trailing edge) because an air stream of 1,200 ft. per min. was flowing out of the hood even when the vacuum on the ejector was 5 in. of mercury. The final reading in Table VII was taken in position three with work on the rest when the air stream flowing down the wheel face was turned outwards towards the operator. This confirms the earlier work on stand grinders.

In an attempt to improve matters, side plates were fitted to close the gaps between the sides of the wheel and the guard. The velocity readings were repeated and are given in Table VIII.

TABLE VIII.—*Air Velocities (with 5 in. Hg. vacuum) taken at Position Three.*

Position.	Ft. per min.	Remarks.
1	1,800	No work on rest.
2	2,200	No work on rest.
3	850	No work on rest.
4	500	No work on rest.
5	0	No work on rest.
6	300/800	No work on rest.

It will be seen from Table VIII that the closing of the side gaps increased the outward velocity at the wheel top and face in positions one and two, and reduced the velocity around the work rest in positions three and four. Once again dust observation and photography showed dust leaking from the wheel top and flowing along the paths which had been elucidated in earlier work[7]. It was then decided to alter the port arrangements inside the peripheral duct. One reason for this was that the system, as it then stood, failed to control the dust completely. But there was a more cogent reason. It was evident that the wheel itself was operating as a fan, as indeed does every rotating wheel. In the past very little attempt seems to have been made to utilize the fan effect of the wheel for the purpose of dust control. The Authors felt that this source of power should not be ignored, and the port openings in the peripheral duct were redesigned in an attempt to use it. Of the two types of port opening designed, Table IX gives the resulting air movement for that first developed.

TABLE IX.—*Air Velocities (5 in. Hg. Vacuum) with Type 1. Port Opening—(No work on rest).*

Position.	Ft. per min.	Remarks.
1	1,200	Air flow into guard.
2	1,000	Air flow down wheel-face.
3	4,300	Air flow into guard.
4	4,500	Air flow into guard.

The most noticeable features were the complete reversal of the air movement at the wheel top in position one (Fig. 10) where an outward velocity of 1,800 ft. per min. was turned into an inward velocity of 1,200 ft. per min., and the very high intake velocities built up in the vicinity of the work rest in positions three and four (Fig. 10).

The flexible hose which connected the air ejector to the guard was then removed and the wheel was run without exhaust ventilation, and without work on the rest. The air velocity was measured at the short metal pipe which had been fitted to the peripheral duct to serve as a connection to the flexible hose. An outwards velocity of 550 ft. per min. was found at this pipe. The new duct and port design was therefore using the fan effect of the wheel to such an extent that it was pumping air, in the desired direction, through the exhaust duct at 550 ft. per min. It was clear, however, that there was still more power available in the wheel and so the inlet port in the peripheral duct was modified to a second design. For this type of inlet port, Table X shows the air velocities recorded (in the positions shown in Fig. 10); the wheel, running without exhaust, pumped air through the vacuum connection at a speed of 800 ft. per min.

TABLE X.—*Air Velocities (5 in. Hg. Vacuum) at the Positions shown in Fig. 10—No work on rest.*

Position.	Ft. per min.	Remarks.
1	1,300	Air flow into guard.
2	1,250	Air flow down wheel-face.
3	4,000	Air flow into guard.
4	4,000	Air flow into guard.

Finally, a strip was added to the top of the guard to close the gap between the wheel top and the guard itself. The machine was again run without exhaust system, and it was found that the addition of this strip increased the outward velocity at the vacuum connection to 900 ft. per min. When the strip was adjusted to give a gap of $\frac{1}{16}$ in. between the wheel top and the guard, the air velocity pumped by the wheel rose to 1,650 ft. per min.

After the completion of these developments, the machine was assembled for practical tests. The dust control had been greatly improved and appeared to be adequate on normal work. The observation technique, however, showed some leakage of dust when grinding materials which gave such heaving clouds that the system was overloaded. This dust leakage was reduced by increasing the diameter of the suction line from $\frac{3}{4}$ in. to 1 in., which reduced the air velocity and increased its volume.

Finally, a second port was added as shown in Fig. 11. The two exhaust connections from the hood were joined through a "Y" piece so that a single flexible hose could be connected to the air ejector. The exhaust system then passed 40 cub. ft. of free air per min. at a vacuum of 3 in. of mercury.

Before the air ejector was connected to the system, the wheel was run without work on the rest, and air measurements were taken to estimate the fan effect of the wheel itself. The results are given in Table XI, which includes measurements on three wheel sizes used in an effort to estimate the effect of wheel wear. The larger wheel gave the higher velocities as had been anticipated, but the most

FIG. 5.—*Hollow pneumatic chisel in use; dust control is effected by Eductor running at a vacuum equivalent to 10 in. of mercury.*

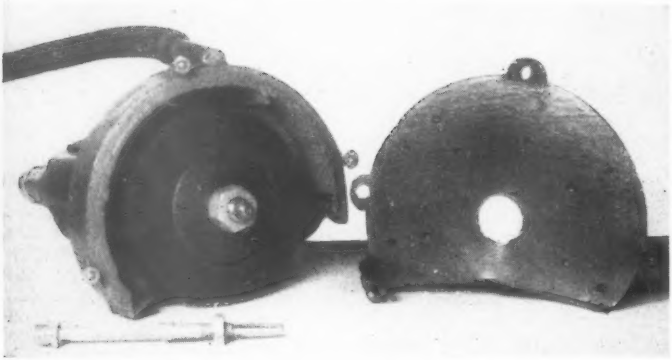

FIG. 6.—*Portable abrasive wheel and wheel hood, with front plate removed to show the internal construction.*

interesting feature was that the wheel was now being used to assist in the control of the dust produced by grinding. The readings which show this are given in Table XI at positions five and six (see Fig. 11). The 6-in. dia. wheel produced an outward velocity of 1,900 ft. per min. at the exhaust connection from the leading port (position six), and an outward velocity of 1,700 ft. per min. at the exhaust connection from the trailing port (position five). With a worn wheel these velocities fell to about 1,000 ft. per min. Even at this lower velocity, however, the fact remains that the wheel itself has been used to produce a very high dust velocity.

TABLE XI.—*Air Velocities with Two Ports—No Vacuum applied and Wheel running without Work on the Rest.*

Position.	6-in. wheel.	5½-in. wheel.	5-in. wheel.	4-in. wheel.
1	4,300	3,500	At cowl 2,600 At wheel 3,400	1,000
2	4,700	3,400	3,350	2,000
3	1,300	—	1,350	1,050
4	2,100	2,300	2,000	6,500
5	1,700	1,600	1,000	—
6	1,900	1,200	1,000	—

The air ejector was then connected, and the system was worked with a vacuum of 3 in. of mercury. The velocities obtained in the positions shown in Fig. 12 are given in Table XII, which also indicates effect of wheel wear from 6 in. dia. down to 4 in. dia. The arrows in Fig. 12 indicate the direction of the air movement which was measured by means of the Velometer.

TABLE XII.—*Air Velocities with Two Ports and 3 in. Hg. Vacuum—Air Ejector Connected.*

Position.	6-in. wheel.	5½-in. wheel.	4-in. wheel.
1	1,300	3,100	2,000
2	—	2,600	1,800
3	3,400	800	1,200
4	6,000	4,000	2,300
A	—	—	2,700
B	350	—	—

Dust Observations

Dust observations and photographs were taken throughout the work by means of a 35-mm. cinematograph camera. The photographs on the completed prototype bench-grinder were taken when grinding a variety of materials including wood and grey iron and in no case did any visible dust leave the hood. Final photographs were taken when grinding another abrasive wheel chosen to give a particularly heavy dust-cloud, so that the system could be tested in conditions of gross overload. Fig. 13 shows the conditions when grinding without exhaust ventilation while Fig. 14 shows the effect of the new ventilation system. When grinding wood,

FIG. 7.—*Dust cloud from a portable grinder operating without the exhaust system coupled.*

FIG. 8.—*Dust control of the abrasive wheel with the exhaust system operating at a vacuum of 5 in. of mercury.*

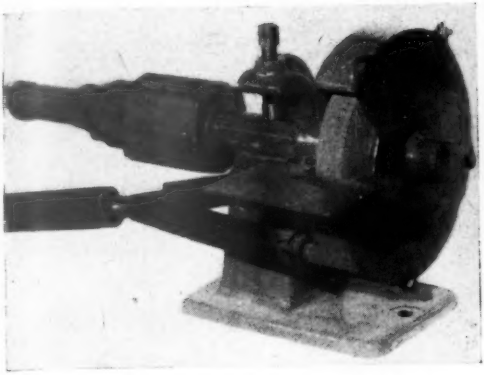

FIG. 9.—*Pneumatically-driven abrasive wheel, 8-in. dia. arranged in a stand as a bench grinder.*

the system gave complete control of all the smoke produced. This may not indicate the efficiency when grinding other materials, but it serves to show the control achieved on very small particles.

The calculated air velocity in the flexible hose was of the order of 12,000 ft. per min.

2. A similar high-velocity low-volume local exhaust ventilation system has been applied to a 6-in. portable grinder running at a peripheral velocity of 9,000 ft. per min. This machine used about 24 cub. ft. of free air per min. at a vacuum of 6 in. of mercury. The calculated air velocity in the $\frac{1}{8}$-in. dia. flexible hose was of the order of 12,000 ft. per min.

3. The exhaust system has also been adapted to an 8-in. dia. bench grinder.

4. The fan action of the wheel itself has been utilized to produce a velocity of 1,000 to 1,900 ft. per min. in the local exhaust ventilation duct without applied vacuum.

5. The new system appeared to be sufficient to reverse the primary air stream which has been shown to flow down the face of grinding wheels. An air intake was measured at the guard opening at the top of the wheel where all previous work has shown air flowing out of the guard.

6. The dust-control system used 46 cub. ft. of free air per min. at a vacuum of 3 in. of mercury.

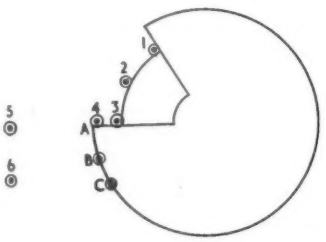

FIG. 10.—*Positions on the wheel hood at which air velocities were recorded; A-B $\frac{5}{8}$ in. and A-C $1\frac{1}{4}$ in.*

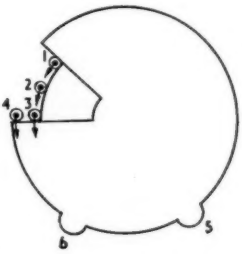

FIG. 11.—*Hood design with two ports—showing the direction of air velocities, measured when running the wheel without exhaust.*

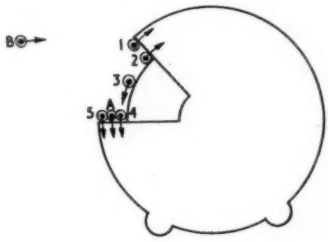

FIG. 12.—*Air velocities with two exhaust ports—showing the direction of air velocities, measured when running the wheel with exhaust.*

Dust Estimations

A short series of dust estimations were made when grinding a piece of steel and also when grinding the other wheel referred to above. This work was done in a laboratory over a short period of time, and the dust clouds generated were sampled with the Owen's jet counter. The results are given in Table XIII, from which it will be seen that with the exhaust system in use, and in the experimental conditions imposed, there was no difference in dust concentration at the breathing level of the operator whether he was grinding or not.

TABLE XIII.—*Dust Estimations taken on the Bench Grinder.*

Sample No.	Particles per ml.	Remarks.
1	700	General atmosphere before start
2	700	Grinding steel with exhaust. Breathing-level sample.
3	600	Grinding steel with exhaust. Breathing-level sample.
4	5,000	Grinding steel without exhaust. Breathing level sample.
5	4,000	Grinding steel without exhaust. Breathing-level sample.
6	700	Grinding wheel with exhaust. Breathing-level sample.
7	700	Grinding wheel with exhaust. Breathing-level sample.
8	10,000	Grinding steel without exhaust. Breathing-level sample.
9	10,000	Grinding steel without exhaust. Breathing-level sample.

Conclusions

1. Dust control has been applied to a hollow pneumatic chisel using only 4 cub. ft. of free air per min. at a vacuum of 10 to 15 in. of mercury.

FIG. 13.—*Dust cloud from the 8-in. dia. bench grinder working without exhaust ventilation.*

FIG. 14.—*Photograph of the 8-in. dia. bench grinder working with the exhaust system fitted and operating.*

7. The suction on all three machines could be induced by a compressed-air ejector or a rotary exhauster.

8. Dust photographs and dust estimations show the control obtained on each of the machines.

9. The dust control achieved on the bench grinder was estimated by the illumination technique, and by a short series of Owen's jet dust counts. In the laboratory conditions imposed during the tests, the new exhaust system controlled all the dust generated by the grinding process.

Acknowledgments

The Authors gratefully acknowledge the assistance they have received from the staff of the mechanical laboratory at Holman Bros., Camborne. Mr. W. B. Lawrie is indebted to Sir George Barnett, H.M. Chief Inspector of Factories and to Mr. T. W. McCullough, O.B.E., H.M. Deputy Chief Inspector of Factories, for permission to complete the work and publish the results. They are also under obligation to the photographic and reproductions branch of the Air Ministry for assistance with the photographs. Figs. 2 to 6 and Fig. 8 are reproduced by courtesy of the Institution of Mechanical Engineers.

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English Electric US Contract

The contract to supply distribution transformers for the Minidoka reclamation scheme in Idaho has been granted to the English Electric Export & Trading Company, Limited, by the United States Department of the Interior. An Italian and a Swiss concern have also received contracts for the scheme.

The department stated that the contracts were granted to foreign concerns because they underbid American tenders by more than 12 per cent. To gain a contract a foreign company's tender must be 6 per cent. below the nearest US competitor, but new policy now provides a specific additional percentage of 6 per cent. when competitive equipment is manufactured in a US area certified as having substantial unemployment. The English Electric bid, including the additional 12 per cent., amounted to $106,055 (£37,877).

A GIANT FLYWHEEL from a 1909 Corliss steam engine, weighing over seven tons, has been transferred to the Birmingham Museum of Science and Industry from Manchester University.

Eating Habits in Industry

We call them canteens; the Americans call them cafeterias. Are they so much better than ours? Miss Winifred McCullough, senior canteens adviser to the Industrial Welfare Society, says that American cafeterias are in point of fact "restaurants inside a factory." It is partly a matter of money, partly a matter of attitude—and the more important of the two is attitude, according to Miss McCullough. "We built our canteens in times of stress and poverty to feed people cheaply and quickly and simply. American cafeterias are going up in full prosperity to feed people who are used to eating well and who have the money to do so." In spite of these differences we can learn from them.

The first of a series of three booklets planned to give British canteen managers the benefit of Miss McCullough's discoveries and comparisons during a 10-week tour of the United States has been published by the Industrial Welfare Society. Entitled "Policy, Premises and Equipment" (3s.), it contains a wealth of new ideas and an illustrated list of labour-saving devices in use in American kitchens.

Joint Iron Council

Year's Proceedings and Social Function Reviewed

REPORT

[ABRIDGED]

At the annual convention of the Joint Iron Council held in London on November 1, the report of the executive committee for the year 1954 to 1955 was presented from which the following extracts have been made:—

In presenting its eleventh annual report the executive feels justified in looking back over the year that has just been completed with a certain amount of satisfaction. The improved trading conditions that became evident in the second half of 1954, which have since been fully maintained in almost all sections of the industry, and the lifting of the threat of re-nationalization through the return of the Conservative Government at the polls, have greatly contributed to this state of mind.

Trade Conditions

There has been a marked improvement in trade conditions during the year under review. During the first half of 1954, the general level of ironfounding activity was little higher than in 1953 and appreciably below the peak rates of output achieved in 1951 and 1952. However, in the autumn of 1954 there was an upward surge in production; in November a new peak was reached in iron castings deliveries, beating the previous monthly record which had stood since March, 1952. In the first quarter of 1955, the production of iron castings exceeded one million tons for the first time in any quarter. This level of activity, after allowing for holidays, has continued unchecked despite difficulties presented by the railway and dock strikes. Total output of iron castings during the year July, 1954 to June, 1955, was 3,865,123 tons, an increase of 5.3 per cent. over the previous year. It is expected that output in the calendar year 1955 will be an all-time record, probably about 3.9 million tons.

The expansion has been uneven between the main sections of the industry. Automobile castings output (excluding tractors) increased by 24 per cent. compared with the year 1953/54, and production of engineering castings rose by 9 per cent. Output of pressure pipes rose by 2 per cent., building and domestic castings by 4 per cent., while the production of railway castings decreased by 11 per cent.

This uneven pattern of expansion has had its effect on the pig-iron producing section of the industry. The greatly increased demand for automobile and engineering castings has concentrated much of the additional requirement for pig-iron on qualities with a low phosphorus content. The available blast furnace capacity for the production of low and medium phosphorus foundry iron was already fully employed, and the shortage of this type of iron has therefore intensified. Partly as a consequence, there has been a marked expansion in demand for suitable alternative materials, *i.e.*, hematite pig-iron, refined iron and steel scrap. During the spring of 1955, a serious shortage of hematite pig-iron developed, partly from the rising demand but also because of production difficulties. The position was worsened by the railway strike in the first half of June, which seriously interfered with production of hematite pig-iron. The demand for high-phosphorus foundry iron has also been strong, but production has kept pace with the ironfounding industry's requirements.

Total pig-iron stocks at ironfoundries have been fairly stable during the year under review. However, hematite stocks dropped sharply in the last few months as a result of the stringency in supplies. Scrap stocks also showed little net change over the year, though stocks of steel scrap rose steadily. The pig-iron charge for the year July, 1954 to June, 1955, was 2,431,744 tons, an increase of 4 per cent. over the previous year. The corresponding scrap charge (including own arisings) rose by nearly 7 per cent. The scrap ratio for the year as a whole was therefore higher than in the previous year, but the upward trend levelled off during the course of the year.

Nearly half the UK output of automobile castings is manufactured in the West Midlands, and the area is also an important centre for the production of engineering and jobbing castings. Consequently, its share in the national output increased to 19.8 per cent., compared with 18.3 per cent. in 1953/54. Most of the other major producing districts maintained their relative positions with the exception of the North-East Coast, where there has been a fall in the share of the national output.

By the end of July, 1954, the ironfounding labour force had declined to 138,668 persons, its lowest level since 1947. This trend was then sharply reversed concurrently with the expansion in the industry's output. By the end of January, 1955, the labour force had increased to 144,522 persons and stayed around that level to the end of the period. The unemployment percentage for ironfoundry workers remained below one per cent. for most of the year under review. Shortages of labour, particularly skilled labour, as well as of raw materials, put considerable difficulties in the way of increasing the level of iron castings production still further. However, the industry, by and large, has fully succeeded in keeping up with the pressure of rising demand, and there has been little sign that any general shortage of iron castings is developing.

Iron and Steel Board

During the course of the year the Joint Iron Council has submitted two reports to the Board, the first being a detailed survey of the factors influencing the future production of iron castings leading up to a forecast, based on certain stated

Joint Iron Council

assumptions, of the total production in the year 1960, with separate totals for each of the six main subdivisions of the industry. This report has been accepted by the Board as a basis for estimates of future raw material requirements. The Council's second report, "Pig-iron Requirements in 1960 of UK Ironfoundries," was based on the conclusions reached in the earlier report. This report has revealed a minimum additional requirement in 1960 of some 420,000 tons of pig-iron, about three-quarters of which is estimated to fall in the low phosphorus or hematite class.

The Board have reviewed the supply position of foundry iron, together with that of steel making iron, and in a report on the "Development of the Iron and Steel Industry from 1953 to 1958" expressed the view that there had been less modernization of the hematite and foundry iron furnaces than in the furnaces serving steel works; the Board went on to say that it was necessary to consider how far present facilities were satisfactory. Since then and towards the end of the period under review, the Board have received a technical report following a special survey, made by them, of foundry iron and hematite furnaces, on the basis of which they have begun discussions with the Council of Iron Producers.

The quarterly meetings with the whole-time members of the Board have continued, and there has been close contact between the staffs of the two organizations on day-to-day matters. Among other matters discussed with the Board have been the Iron and Steel Scrap Control Order, the provision of finance for research and other services to the industry, and the collection and publication of statistical information.

Control of Iron and Steel Scrap

Growing dissatisfaction with the effects of the Control Order came to a head towards the end of 1954, when the Ministry of Supply appointed a small working party, including representatives of the scrap merchants, the British Iron and Steel Federation and the Joint Iron Council, to review the working of the Order and to make recommendations. The working party reported in favour of changes in the relative prices in certain areas so as to remedy the disparities which had arisen through successive flat-rate price increases over a period of years made to meet increased transport charges. These had tended to distort the distribution of scrap so as to create shortages in certain areas. The changes proposed by the working party were approved in principle by the executive and a revised Control Order giving effect to them was signed by the Minister in May, 1955. No fundamental changes in the Scrap Control Order were proposed by the working party, but a periodical review, the first to take place within six months of the new Order, was proposed by the Council and accepted by the Ministry.

Coal and Coke

Further increases in the price of coal with consequent effect on both blast furnace and foundry coke prices and in due course on the cost of transport have served to focus attention once again on the vital interest of the iron industry in the efficient administration of the coal industry. The conclusions of the long awaited Fleck report, the latest heavy increase in coal prices and the announcement of further financial losses taken together give no cause for satisfaction and, to repeat what was said in the last report, the failure of coal output to meet the needs of the country continues to cause the greatest concern.

As far as future supplies of coke are concerned, the British Coking Industry Association on behalf of the producers of foundry coke has been put in possession of the Council's views on the future level of ironfounding production, and it is understood that these will be taken fully into account in the planning of future coke oven capacity and coking coal supplies.

Health and Safety in Ironfoundries

In pursuance of the policy of mitigating the effects of undue prominence given in certain quarters to reports of bad working conditions in ironfoundries, the Council of Ironfoundry Associations' publication entitled *Years of Endeavour* was released during the year under review. This was a factual illustrated report of the voluntary work done in the industry over the years following the publication of the Garrett Report. Copies were widely distributed and the booklet has met with an excellent reception.

The CFA's safety committee has been active throughout the period and its manual of safe working practices—largely the work of a special sub-committee—has reached an advanced stage. The committee has reviewed many legal cases and much advice of a practical kind has been given to member-firms both on safety matters and on the interpretation of the new Iron and Steel Foundries Regulations, 1953. The chairman of the committee, Mr. Colin Gresty, presented a paper on "Safety in the Ironfoundry" to the 1955 National Industrial Safety Conference of the Royal Society for the Prevention of Accidents, and members of the safety committee contributed to a half-day conference in Birmingham on "Safety in the Ironfoundry" in July, 1955, organized by the CFA in collaboration with the Birmingham and District Industrial Safety Group. In these and other ways and notably through the medium of the CFA's general and management *Bulletins* issued monthly and bi-monthly to member-firms, every effort has been made to keep the achievement of better working conditions in the forefront of company policy.

The introduction of Regulations in 1953 initiated a period of closer working with the Factory Department and with those employers' organizations concerned more specifically with labour matters, while at meetings of the Joint Standing Committee on conditions in ironfoundries (on which the CFA is represented by Mr. Colin Gresty and Mr. A. E. Pearce) there have been opportunities for consultation between the employers, the trade unions and the Factory Department.

The coming into effect on January 1, 1956, of the Regulations concerned with the suppression of dust and fumes and with the provision of bathing facilities will create problems, not easily capable of solution, for many ironfoundries. The successful conference organized by the British Cast Iron Research Association in the spring of this year gave prominence to the work of the Foundry Atmospheres Committee of the Association in the ventilation field, but it is evident that some considerable time must elapse before the research that has already been done is fully translated into practical results.

The Industrial Health Advisory Committee appointed by the Government during the year has already had two meetings and has initiated a comprehensive programme of work. It is evident, therefore, that there is to be no relaxation in Government pressure directed towards the achievement of higher standards of industrial health.

Atmospheric Pollution

The Government's Clean Air Bill published just before the summer recess largely follows the recommendations of the Beaver Committee. The excutive has recognized the serious implications to the iron industry if ill-considered or inexpert pressure were to be applied in pursuit of what from a national standpoint may be accepted as desirable objectives. It has accordingly represented to the Minister its wish that the industry should be directly responsible to a central inspectorate to the exclusion of the local authorities whose record in this field, in the experience of many member-firms, leaves much to be desired, and many of which are unlikely to have at their disposal adequate technical advice. The Minister, while expressing a desire to follow the recommendations of the Beaver Committee so far as possible, is not prepared to incorporate a decision on this point in the Bill. The matter is clearly one of such vital importance to the industry that it cannot be allowed to go by default, and the executive will continue to impress its point of view on the Minister.

Training and Education

The CFA's Training and Education Committee, guided by its chairman, Sir Harold West, and assisted by the Council's training officer, has focussed attention on the provision of training for supervisors and a study of the essentials of craft training. A pilot course for foundry supervisors held at the hostel of the National Foundry College in April, 1955, led to a decision to hold a residential course of approximately a week's duration during the summer vacation and it is hoped to continue these courses at regular intervals.

Both the National Foundry College, under its new chairman of the Board of Governors, Sir Frederick Scopes, and the National Foundry Craft Training Centre, have continued to have the support of the executive. With the assistance of the training officer it is hoped to direct the attention of member-firms more specifically to the advantages to be gained by a fuller participation in the work of these institutions, which continue to give great benefit to the industry in the training of its future leaders and operatives.

Research and Development

The executive has given consistent support throughout the year to the development of research work in the industry In that connection, mention should be made of the investigations undertaken by the British Cast Iron Research Association into the problems of foundry dust and ventilation at the knock-out. These subjects fall within the purview of the Foundry Atmospheres Committee, which continues vigorously in being. The BCIRA has maintained also the provision of its services to ironfoundries through the Operational Research Team, and its work upon shell moulding among other technical developments. The executive also records its appreciation of the services rendered by the director and his staff.

The BCIRA has continued to rely for the greater part of its funds upon the contribution from the JIC. The Council supports also, by grant, the work of the British Iron and Steel Research Association in the study of blast-furnace operation. The work of the technical committees of the Institute of British Foundrymen has been supported, as in past years, by a grant from the Council. Many of the technical questions studied by these committees are of much interest to ironfounders. Those which have been under consideration in the period under review have included such matters as ingates, flow of metal, mould drying, cupola development, and foundry coke.

Transport

In accordance with the Transport Act, 1953, the British Transport Commission lodged with the Transport Tribunal a railway merchandise charges scheme on March 21, 1955. Close co-operation has been maintained with the British Iron and Steel Federation and it has been decided that the JIC should lodge an objection in full support of that prepared by the Federation. Mr. Ramsay Willis, junior counsel for the Federation, will act for the JIC.

There are several important features of the scheme which are considered by trade and industry to be objectionable. In particular, the system of maximum charges which the scheme is designed to establish will give charging powers to the Commission to raise any particular rates or the general level of railway charges by substantial amounts, without any right of appeal on the part of the traders.

Although the Commission have stated that for the time being it is not intended to interfere with existing exceptional rates, pending a systematic review of all such rates, it has been calculated that in extreme cases the new maximum charging powers, if used, might result in increases of up to 400 per cent. on existing rates.

Industrial Rating

Towards the end of 1954, the calls for the abolition of industrial derating had become such that the exeçutive thought it prudent to write to

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the Minister of Housing and Local Government setting out its views on the subject. The letter urged the Minister not to accede to the numerous requests for the abolition of derating which had been pressed on him from many quarters. It went on to show that revaluation, which is at present taking place, and the abolition of derating, would increase the rate burden of industry tenfold unless there were a substantial drop in the average rate levied. The new valuation lists will come into force in 1956. The evidence so far available shows that revaluation alone is likely to increase by two-and-a-half times the rateable value of industrial premises in England and Wales.

An unsuccessful attempt was made by the Opposition to abolish derating by amending the Rating and Valuation Bill when it was before the House of Commons. The Minister of Housing and Local Government announced during the debate that the Government was undertaking a comprehensive review of local government finance which would include the question of derating.

Finance

The problem of expanding the funds required for research, education and other activities of the Council has been met in accordance with the letter sent to member-firms in August, 1954, by extending the tonnage payments made on foundry pig-iron to other irons not previously contributing and by an increase in the amount per ton. This has resulted in a substantial increase in the funds available and has enabled payment to be made in the current year to the British Cast Iron Research Association up to the full amount necessary for the Association to earn maximum Government grant according to the arrangements made with the Department of Scientific and Industrial Research, which cover the five years from July 1, 1954, to June 30, 1955. As the changes only became effective from November, 1954, and the Council was faced with an annual deficit on its commitments, the accounts for the year 1954 to 1955 do not reflect the benefit to be obtained from a full year under the new arrangements.

The finance committee is giving active consideration to the ways in which the funds likely to be available can be expended to the best advantage having regard to the many and varied claims which have to be met from this source. The response to the Council's letters of August, 1954, and July, 1955, is such as to leave no doubt in the minds of the executive as to the general acceptability of the arrangements.

Statistics

Changes in detail in the statistical returns required by the Iron and Steel Board from iron-foundries during the year have been welcomed by the executive after the fullest consultation in their preparation. The load on individual firms has been perceptibly reduced without serious loss of accuracy or reliability. The report of the Verdon Smith Committee on the Census of Production did not fully accord with the views of the executive as conveyed to the committee, though some co-ordination with the statistics compiled by the Iron and Steel Board has been achieved by negotiation with the officials.

TABLE I.—*Production of Iron Castings, according to use (Grey and Malleable).*

	Main fields of consumption.	1952.*	1953.	1954.
1	Building and municipal (pipes, gutters, manhole-covers, baths, sanitary goods)	271,763	293,799	301,605
2	Cooking and heating apparatus, including radiators	239,616	223,659	230,319
3	Other domestic appliances	12,873	10,768	13,106
4	Pipes and fittings for gas, water, sewage, etc.	627,454	683,338	710,470
5	Coal mining, quarry, clay and cement plant	66,946	61,040	60,618
6	Gas production	35,995	31,636	28,523
7	Electricity generation and distribution	107,102	80,761	85,832
8	Motorcar and cycle industry (excluding tractors)	289,169	271,357	316,004
9	Railway equipment	349,902	328,638	311,294
10	Shipbuiding and docks	113,470	103,795	95,322
11	Prime movers (turbines, engines) for land use, and transmission machinery	132,699	98,556	104,768
12	Boiler-house plant for industry, etc.	76,019	63,947	60,658
13	Agriculture and food processing (including tractors)	194,172	162,121	204,294
14	Machine-tools	217,655	182,711	178,061
15	Textile machinery	144,541	107,270	118,852
16	Valves, pumps and compressors	88,657	70,925	70,766
17	Chemical plant	26,614	23,918	24,242
18	Ingot moulds for steel and non-ferrous metal manufacture	322,689	374,471	352,107
19	Iron and steel works' plant and rolls for mills	137,385	131,199	121,891
20	Cranes and conveyors for industry, transport, etc.	40,286	37,486	39,324
21	Printing and paper machinery	28,131	22,767	25,723
22	Balance (general engineering and jobbing castings)	307,599	274,267	288,713
	Total	3,830,737	3,638,429	3,742,492

* 53 weeks.

ANNUAL CONVENTION

The convention proceedings on November 1 at which the above report was presented consisted of two sessions. In the morning, the 11th annual report of the JIC Executive Committee was submitted for discussion, and after luncheon there was a discussion on the work and services of the British Cast Iron Research Association, introduced by Mr. S. H. Russell, president of that Association.

Before submitting the report, the PRESIDENT said that the JIC had lost a dear colleague by the death of Mr. Arthur Watson, the late assistant managing director of the Stanton Ironworks Company, Limited, and a member of the executive committee since 1945. Tributes had been paid to him; apart from the work he had done for the Council; all connected with it had lost a good friend. The assembly observed a period of silence in tribute to the memory of Mr. Watson.

THE PRESIDENT said that the industry was hoping to have a record production in 1955, reaching an output of 3.9 million tons of iron castings by the end of the year. Increased demand had taken effect in some sections, particularly for automobile and

engineering castings, pressure pipes and domestic castings, while there was a fall in respect of railway castings. The latter, he suggested, might be a temporary trend if railway modernization continued; otherwise there might be a rise in the figure given in the report. There was a good relationship between the JIC and the Iron and Steel Board, with whom the Council had discussed a number of important points during the year.

During the year there had been considerable increases in the price of coal, and those increases had been reflected in the price of foundry and furnace coke. He did not think that at the moment in the foundry industry there was any serious shortage of coke, though there was not the quality of coke that the founders would like.

Safety

MR. COLIN GRESTY (chairman, CFA Safety Committee) then spoke on the section of the report dealing with health and safety, reviewing its various implications.

Speaking of the Government's Clean Air Bill, the PRESIDENT said that the matter was important and might have repercussions. There was a strong conviction in the ironfounding industry that they should not be at the mercy of local authorities, but would prefer to come under central inspection. At an appropriate opportunity, the JIC would continue to impress the industry's point of view on the Minister and his department.

On the section of the report covering research and development, DR. A. B. EVEREST, as president of the Institute of British Foundrymen, expressed the appreciation and indebtedness of that body to the JIC for the support given financially to its technical committees. He was in a special position to be able to assess the value of that support, since he had been vice-chairman of the Institute's Technical Council for several years and had seen the various purposes to which the money was put. He would like the members of the JIC to realize that without that money the Institute could not carry out some of the schemes which were being dealt with by its committees.

THE PRESIDENT, dealing next with transport matters, said members probably knew that the British Transport Commission had stated its case for changes in the present method of charging for goods carried by rail, to which the JIC was objecting.

In presenting the financial section of the report, which showed a satisfactory position, SIR FREDERICK SCOPES (chairman of the JIC Finance Committee), said, with reference to Dr. Everest's remarks, how much the JIC appreciated the close co-operation with the Institute of British Foundrymen.

MR. S. H. RUSSELL then expressed to Sir Frederick Scopes the gratitude of the JIC for his work as Finance Committee chairman, a tribute warmly endorsed by the president and received with acclamation.

Educational Matters

SIR HAROLD WEST (chairman, CFA Recruitment, Training and Education Committee), speaking on the references to training and education in the report, said a matter which was perhaps interesting the Committee most was the comparative absence of technical manuals or books of instruction for students in the form required; this question was now receiving close attention. Another thing which had impressed them was the need for a conference on subjects of importance in recruitment, training and education at all levels in the industry. Such a conference was being planned for May next year.

THE PRESIDENT expressed gratitude to Sir Harold West, who took such a great personal interest in the work of the committee.

At this stage, SIR FREDERICK SCOPES referred to the work of the National Foundry College, of which he is chairman of the Board of Governors. He was satisfied that the College had a most important job to do for the industry; but wondered seriously how far the facilities available were known throughout the industry. Appealing to all for full support, he said that although there were a number of important companies, as well as smaller ones, that might perhaps need the services of people who had had training such as that provided at the College, a large number of firms had not sponsored students there since the College got going after the war. It had a fine organization and a fine situation alongside the Wolverhampton Technical College.

THE PRESIDENT said the National Foundry Craft Training Centre also was doing valiant work. About six weeks ago he had sent out an appeal for help for that Centre. Fortunately the courses were full at the moment, but he urged the industry to continue to make full use of the special training facilities there. His own company were very pleased with the results obtained.

The report was unanimously adopted and, in closing the meeting, the PRESIDENT thanked the executive committee, especially Sir Frederick Scopes, for the support given him. The president also expressed appreciation to the director and his staff and thanked them for their splendid team spirit throughout his year of office.

MR. A. W. W. TAYLOR expressed to the president on behalf of all member-firms their thanks for his chairmanship and for his outstanding success in the presidency. His words were supported by cordial applause.

BANQUET

As noted briefly in the JOURNAL of November 3, the annual banquet of the Joint Iron Council was held at the Dorchester Hotel, Park Lane, London, W.1, on November 1, the president, Mr. N. P. Newman, J.P., being in the chair.

Proposing the toast of "The Iron Industry," the Rt. Hon. Peter Thorneycroft, M.P., President of the Board of Trade, recalled that his family had remotely some connection with it. His great great grandfather was an iron master in Wolverhampton, and in looking round him to-night, said Mr. Thorneycroft, he was rather sorry the old gentleman had not stayed in the iron industry.

The iron industry had returned to the Board of Trade from the Ministry of Supply, but it did not look as though the move had caused too much shaking up. Indeed, it was rather difficult to know

that anything very much had happened. The civil servants who were responsible in the Ministry of Supply had come over also, and some of them were present at the dinner.

"A Vigorous Industry"

He complimented the industry on its vigour in tackling its own problems. Since the war, output had doubled, and the turnover was in the region of £250 million a year. The industry was literally the foundation of many other industries, including, for example, the vehicle industry, while its exports, direct and indirect, represented a formidable source of national wealth. In all these matters, national prosperity and private prosperity went most happily together. Good wages, good profits and rising output—the industry had them all, and they were all that a good ironfounder should wish for.

The truth was that the nation had consumed more, spent more and invested more than perhaps at almost any other time. While the country could afford to consume and spend and invest a lot—the latter was particularly important—nevertheless one could have too much even of a good thing, and the nation had undoubtedly been trying to take out rather more than it should if it was to meet its vital export needs to the full. During the past six months, investment had risen sharply and there had been great pressure on the heavier end of the engineering industry. Consumption, too, had risen. In addition, there had been expensive imports of raw materials which normally were produced at home, particularly of steel and of coal.

One of the biggest contributions to the national economy would be if the coal industry were to become once again a net exporter of coal. Everyone would wish success to the Minister of Fuel and Power's renewed drive for fuel economy and efficiency. The iron and steel industry had a fine record in fuel efficiency going back for many years, but there was always room for improvement. Every ton of coal saved and every penny subtracted from the bill for coal reduced Britain's dependence on foreign coal and lightened the burden on the balance of payments.

However, all these things—the bill for foreign coal, the investment pressure and the rising levels of consumption—called urgently for remedial action. The "doctors" had had a good deal of advise as to just what the treatment ought to be, but everybody would agree that the draught which had just been administered tasted beastly, as good medicine generally did. Some, however, said that it was nothing like strong enough. At any rate, it was suggested that the Government should await the patient's reactions before being encouraged to rush in and double the dose.

This was not the occasion for political discussion, but he thought he could say that the Chancellor of the Exchequer could be given tribute both for his courage and for his wisdom in doing these things before the crisis developed, rather than afterwards. The task of the Government remained to seek a stable balance in the economy. The task for industry was to take advantage of it, above all in the field of exports. The job of the Board of Trade remained as ever—not to dictate to industry the way it should conduct its business, but to seek to serve industry in any way which lay open.

He was sure that in the future the relations between the Government and the industry in general would remain on the same happy basis as in the past. The industry's records and achievements demonstrated its ability to face current problems. He commended everyone present for what they had done and wished them well in the tasks ahead.

Chairman's Reply

THE CHAIRMAN, MR. N. P. NEWMAN, J.P., in reply, agreed that the changeover from the Ministry of Supply to the Board of Trade had been extremely smooth, and he was sure that there would be the closest and friendliest co-operation. There was justification for the industry's pride in its really enormous achievements since the war. A year ago, he had put forward the forecast that by 1960 there would be an output of iron castings of 4 million tons per annum. Since then, due in large part to the very big expansion programme of the automobile ironfounders, coupled with the higher steel output targets and the railway modernization programme, the industry had been obliged to revise its forecast for the period to 1960 to 4¼ million tons, or half a million tons more than was achieved in 1954. It already appeared as though by the end of the current year an output of 3.9 million tons would be achieved, or 150,000 tons more than the peak year of 1952.

Based on the tonnage output per man year, there had been a rise in output every year since the war, except in the fuel crisis year of 1947, which many people remembered very well, and in 1952, when there was a temporary recession in demand. It was estimated that the tonnage output per worker in 1955, would be 30 per cent. more than the 1946 level and 14 per cent. more than in 1952, the peak period.

These output achievements brought their difficulties in trade, and one of the difficulties with which the industry was endeavouring to contend was the shortage in particular of low phosphoric pig-iron. He was particularly pleased to say that the Iron and Steel Board, with whom there were the closest and most friendly relations, and the Council's partners, the Council of Iron Producers, were grappling with this problem and it was felt confident that in due course they would find a solution. It was appropriate at this stage to pay special tribute to the iron producers for their tremendous efforts during the disastrous railway strike, when they managed somehow, by emergency means, to keep the industry fully supplied during that very difficult period.

The Board of Trade, amongst many things, was now responsible for scrap metal, and he felt he would be failing in his duty not to emphasize that in the view of the iron foundries it was most important to maintain low and stable scrap prices. If scrap was decontrolled, higher prices in iron castings were inevitable. Neither the industry nor its customers wanted to pay higher prices while every-

one was doing his best to hold down costs and remain competitive in the export market.

Quite recently, there had been an appeal to employers by Sir Walter Monckton to support the Budget. He was not quite sure what was involved in this but he would suggest that there were three responsibilities; and in entering such a contentious field, he was doing so not only as a founder, but as an engineer. The first thing that employers had to struggle to do was to stop wage inflation. They would be failing in their jobs if they did not preach the policy of "No more money for no more work, but more money for more production."

Employers must keep abreast of modern techniques. They must spend their money to ensure retaining the most competitive conditions possible by being up-to-date, and they must use their gross profits where necessary to keep prices down, to keep them stable, and to retain exports. The Government were the other party in this and they must surely help by keeping down the cost of raw materials supplied by the nationalized industries, particularly the price of coal, which affected power, gas and other costs.

SIR FREDERICK SCOPES, immediate past-president, proposed the toast of "The Guests," of whom there was a great number, many being distinguished in the foundry and kindred industries.

Fatal Accident at Tipton

Negligence probably contributed to a fatal accident at a Tipton foundry, said Mr. A. E. V. Sherwood, Dudley Coroner, at an inquest on November 10. The inquest concerned the death of Mr. Benjamin Bowater (47), a moulder, who was fatally injured when a two-ton load which was being moved by a crane fell on him. It was stated that the load was only secured by three chains when four should have been used. A verdict of "accidental death" was returned on Bowater, who was found to have died from multiple injuries on arrival at the Dudley Guest Hospital on October 26.

Mr. J. P. Fithern, works engineer at the Coneygre Foundry, Tipton, said boxes of castings were being moved six at a time by a crane from one end of the shop to the other. Normally, four chains and hooks were used to secure each load of boxes, but in this case only three were attached. He would not have allowed only three chains to be used if he had known. The weight of the load was 2 tons 6 cwt. The crane driver said that he began to move the load after getting a hand signal from a man named O'Brian, who was in charge of hooking up the boxes. After travelling a few yards he saw five boxes had fallen and that the remaining box was swinging by two chains. When it was not possible to fix the four chains to a load, it was usual to move it a short distance to fix the fourth. "If I had noticed there were only three chains securing the load I would have stopped the crane and lowered the load to the ground for the other chain to be fixed," said Rigby. Mr. T. O'Brian said for the past five years he had been responsible for the loads being moved. Another man put two chains on the back of the load, which fell, while he fixed only a single chain to the front. "I did not put the other chain on because I could not get my hand between the stacks on the truck. These stacks were hot," he said.

Answering the Coroner, O'Brian said his instructions were to use four slings whenever possible. He would not regard it safe to cross the shop with only three chains. "In this case there was no space for me to fix the fourth chain." Mr. H. Farrington, a moulder, said he saw the load being moved; he saw the chain swinging and the boxes tipple and fall. Bowater was under the load when it fell.

Mr. Sherwood said it was clear that if four chains were used the load was safe, with three slings, it was quite clear it was not safe. As events had turned out a man was killed which showed that what O'Brian had said in the witness box was perfectly true. "The load, to my mind, must have been 'cockeved' if it was being carried through the air on three chains." The Coroner told the jury: "There may be negligence here, there probably was, but that is a matter for another court."

Inco's Record Earnings

Net earnings, in terms of US currency, of $67,651,667 after all charges, equivalent after preferred dividends to $4.53 per share on the common stock, are revealed in the report of the International Nickel Company of Canada, Limited, for the nine months ended September 30, 1955. These earnings were the highest for any corresponding nine months, exceeding by $20,221,000 the record high earnings in 1954. For the nine months ended September 30, 1953, net earnings were $41,252,680, or $2.72 per common share.

In the three months ended September 30, 1955, net earnings were $22,321,756, equal to $1.49 a share on the common, compared with $24,651,663, or $1.66 a share of common in the previous quarter and with $14,844,376, or 99 cents a share, in the third quarter of 1954.

As a major world copper producer, earnings in the first nine months of 1955 benefited from higher copper prices. Earlier this month the directors declared a dividend of 65 cents a share on the common and a year-end extra dividend of $1.35 which will bring total payments for 1955 to $3.75. In 1954 dividends totalled $2.90.

In a letter to shareholders accompanying the report, Dr. John F. Thompson, chairman, announces that trial operation of the equipment in the first unit of the company's iron-ore recovery plant near Copper Cliff, Ontario, has begun and that the plant is scheduled to go into commercial production in the near future.

Changes of Name

Among companies which have recently changed their names are those listed below. The new titles are given in parentheses.

HEENAN & FROUDE, LIMITED, Worcester Engineering Works, Worcester (Heenan Group, Limited).

BARLING'S FIVE SALES, LIMITED, 29, Maucaulay Road, London, S.W.4 (John Hooper (Engineers), Limited).

KOMROWSKI STEELS, LIMITED, 137/139, Salisbury House, London Wall, E.C.2 (Pymeas Trading Company, Limited).

HARDEN TOOL & GAUGE COMPANY, LIMITED, 6-10, Regent Place, Birmingham, 1 (Harden Precision Engineering, Limited).

LIMIT ENGINEERING COMPANY, LIMITED, Windsor Street, Islington, London, N.1 (Limit Engineering Group, Limited).

STOCKTON SHEET METAL WORKS, LIMITED, Britannia Works, Norton Road, Stockton-on-Tees (Stockton Metal Works, Limited).

N. P. HOWARTH, LIMITED, general and mechanical engineers, etc., of 164, Oldham Road, Manchester, 4 (Northern Fabrications, Limited).

ROLLING STOCK COMPANY, LIMITED, Westfield Wagon Works, Albert Hill, Darlington (Rolling Stock & Engineering Company, Limited).

CRAWFORD & COMPANY (TOTTENHAM), LIMITED, ironfounders, toolmakers, etc., of Tower Hill Works, Witney, Oxon (Crawford Colletts, Limited).

British Shipbuilding

Lloyd's Returns for September Quarter

Steamships and motorships under construction in Great Britain and Northern Ireland at the end of September totalled 346 ships of 2,147,057 tons gross; an increase of 65,523 tons compared with 338 ships of 2,081,534 tons in the previous quarter, states Lloyd's Register shipbuilding returns for the quarter ended September 30, relating to merchant ships of 100 tons gross and upwards. The vessels included 106 steamships of 1,231,360 tons, and 240 motorships of 915,697 tons. In other British Commonwealth countries there were under construction 16 steamers of 19,959 tons and 29 motorships of 80,791 tons. Oil tankers building in Great Britain and Northern Ireland in the June quarter totalled 79 ships of 993,963 tons, a decrease of 17,118 tons compared with the previous quarter. Vessels building in the world numbered 1,379 of 6,285,699 tons compared with 1,349 of 6,100,534 tons, including 4 wooden ships of 1,714 tons. The total included 297 steamers of 2,864,252 tons and 1,714 motorships of 3,419,733 tons. Construction in hand in the principal districts of Great Britain and Northern Ireland is indicated in Table I.

TABLE I.—*Vessels under Construction in Principal Districts of Great Britain and Northern Ireland.*

District.	September 30, 1955.		June 30, 1955.		September 30, 1954.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Aberdeen ..	22	26,974	22	24,567	16	21,170
Barrow ..	4	86,412	4	86,000	5	97,750
Belfast ..	21	240,140	18	223,690	17	194,350
Bristol ..	4	2,430	4	2,030	6	3,820
Clyde—						
Glasgow ..	70	437,032	75	443,224	76	475,724
Greenock ..	31	197,245	32	216,732	30	205,215
Dundee ..	4	28,410	6	35,110	6	43,800
Hartlepool ..	8	46,371	7	42,894	9	56,069
Hull	37	19,095	33	18,214	28	12,917
Leith	17	58,954	16	57,990	14	43,216
Liverpool ..	17	142,143	19	153,462	16	122,613
Middlesbrough	13	204,173	12	168,523	15	197,162
Newcastle-on-Tyne ..	37	390,044	37	391,570	34	364,585
Southampton	5	2,556	3	1,734	3	5,434
Sunderland ..	33	253,040	28	202,760	27	206,927

Pay Increases

More than 11,389,000 workers received aggregate weekly wage increases of £4,580,300 in the first nine months of this year, compared with increases totalling £2,646,000 in the weekly wages of 8,406,000 workers in the corresponding period of last year. During September, about 412,000 workers benefited from increases, estimated to cost £146,000 a week. The weekly wage index remained unchanged during the month at 153 (June, 1947 = 100).

In the first nine months of the year nearly 3,200,000 working days were lost by 553,400 workers through industrial disputes, against 962,000 days lost by 277,700 workers in the corresponding period of 1954. In September 227,000 working days were lost through disputes—three times as many as in August and twice as many as in September last year. Nearly 30,000 miners were involved in strikes costing 63,000 working days during the month.

CROFTS (ENGINEERS), LIMITED, Bradford, has subscribed £10,000 to be made under Deed of Covenant to the Bradford Cathedral appeal fund.

Correspondence

DEFECTS IN CUPOLA-MELTED IRON

To the Editor of the FOUNDRY TRADE JOURNAL

SIR,—Mr. A. D. Morgan's letter in your issue of October 27, under the above heading, confirms the findings of the writer in that an excess of manganese in cupola-melted cast iron is responsible for the occurrence of severe gas holes in castings. The holes are characteristic in appearance and, because of their ease of identification after the shotblasting of the castings, they have been labelled "manganese holes" by my foundry staff.

Figs. 1 and 2 (see facing page) illustrate the appearance of the "manganese holes" in castings $\frac{5}{32}$-in. thick and having the following chemical composition:—Total carbon, 3.21; silicon, 2.83; manganese, 0.67; sulphur, 0.094; and phosphorus, 1.18 per cent. Micro-examination revealed the presence of excessive quantities of manganese-sulphide inclusions in the vicinity of the holes and also the presence of a slag-like compound inside certain of the cavities; Figs. 3 and 4 illustrate this. It is felt that the angular shape of the manganese-sulphide inclusions is a significant factor. It was found, when melting a pig-iron having a lower manganese content or omitting ferro-manganese additions to the cupola and at the same time pouring at a higher temperature, that the "manganese holes" did not appear.

While the mechanism of formation of the defect is not clearly understood by the writer, there would appear to be a critical relationship between manganese and silicon and sulphur in cast iron melted under certain conditions, which need not necessarily be restricted to cupola melting.

This statement, including the influence of silicon, is based upon the writer's recent experience in his company's foundry in South Africa where the same type of defect, but on a more pronounced scale, was occurring in castings up to 2-in. thick. The reduction of manganese content of the iron, alteration to sand and cupola conditions and increased lime additions had relatively little effect. However, observation of runner-heads during freezing revealed a pronounced exudation of a brittle and slag-like material which, on analysis, was found to be high in silicon. By a simultaneous reduction of both silicon and manganese contents in the iron, it is possible to report the absence of "manganese holes" in the castings now produced in that foundry. The manganese and silicon contents were formerly 0.9 to 1.1 and 2.0 to 2.3 per cent., and they have been reduced to 0.75 max. and 1.7 to 1.9 per cent. respectively. The writer endorses Mr. Morgan's recommendation that the control of sulphur by manganese alone is unwise.—Yours, etc.,

JEFFREY BERNSTEIN,
Works Manager.

Simplex Electric Company, Limited,

Dust Removal. Power-Gas Corporation Limited. Stockton-on-Tees, in a four-page leaflet, illustrate and describe the Favorit system of filtering atmospheric dust. It incorporates a sleeve-shaking device and a valve change-over mechanism for which a removal efficiency of 95 per cent. is claimed. The leaflet is available to readers on writing to Stockton. It is a useful addition to growing trade literature on this subject.

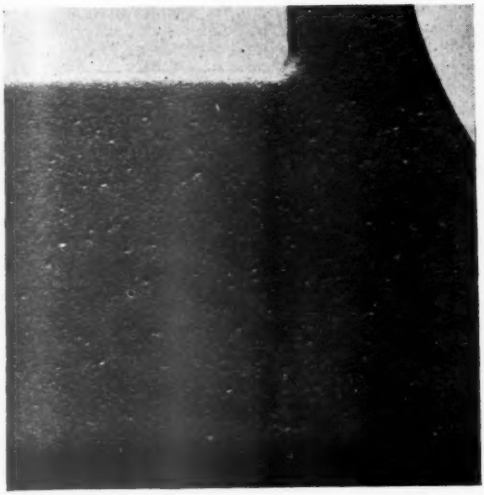


FIG. 1.—*Severe case of "manganese holes" in a casting $\frac{5}{32}$-in. thick, after shotblasting ($\frac{1}{3}$th full size).*

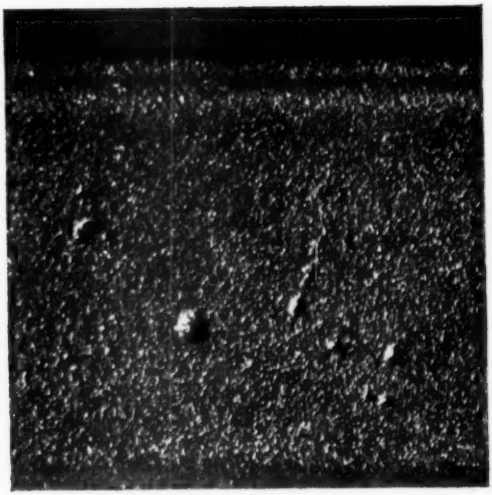


FIG. 2.—*The glossy interior of the holes is shown and their spheroidal shape (full size).*

FIG. 3.—*Concentrations of manganese-sulphide inclusions around a "manganese hole" and a slag inclusion inside the cavity. Bright spots are visible in the slag structure.* (×100; *unetched.*)

FIG. 4.—*Illustrating the angularity of the manganese-sulphide inclusions associated with a "manganese hole."* (×500; *unetched.*)

Notes from the Branches

Lancashire

Headed by the president, Mr. A. Kirkham, members of the Lancashire branch of the Institute of British Foundrymen, on November 2, visited the works of Gummers, Limited, Effingham Brass Works, Rotherham, where they were especially interested in the production of shell moulds. The layout and equipment of the brass and bronze foundry came in for very favourable comment. Later, the party left to inspect the works of Guest & Chrimes, Limited, also of Rotherham.

East Anglia

The first meeting of the 1955/6 session of the East Anglian section of the London branch was held on October 18, when the president, Mr. W. E. Cates, was inducted. Mr. C. E. Jennings, the retiring president, was chairman for the evening, the programme comprising the presidential address and a talk by the president. MR. JENNINGS referred to his associations with Mr. Cates who had always been a very active member of the section. He had given it his full support and on many occasions had presented very practical papers, also participating in the discussions.

MR. CATES, upon being inducted, said he admired the successful way Mr. Jennings had fulfilled his duties as president and on behalf of all members thanked him for his many duties in the interests of the foundry industry, especially in an advisory capacity. Mr. Cates then delivered his presidential address, entitled "Taking Stock, Science, the Foreman and Discipline" after which he presented a Paper entitled "The Foreman's Rôle in Productivity" followed by slides.

During the discussion which followed the talk, MR. D. CARRICK reviewed other methods of checking efficiencies, such as recording the metal pigged per cupola melt, and nett good and gross castings resulting per ton melted. He added that many jobbing foundries are found to use excessive runners, headers and downgates, and are often lavish with the use of new materials.

MR. BERRY said that he preferred the use of terms such as "yield" and "output" because he felt that the term productivity was used too much. Automation was in fact always in the process of development and if this term continued to be used to infer a new era it could result in unsettling operators.

MR. JENNINGS outlined his firm's aims, which were that the previous year's maximum became the next year's minimum. He quoted American/British comparisons regarding extra output per man and what was spent to achieve it. America, he added, probably spent five times as much as was expended in this country to achieve extra output.

The evening programme concluded with an appeal by the president for the Tom Makemson Memorial Fund; its aims were outlined and a collection was made.

Dinner and Social Evening

The annual dinner and social evening was held at the Oriental Café, Ipswich, on Friday, October 28, when 42 members and friends within the section were honoured by the presence of Mr. Frank Hudson (president of London branch) and Mr. A. R. Parkes (secretary of the branch and assistant editor of FOUNDRY TRADE JOURNAL).

At the conclusion of the dinner, MR. W. E. CATES introduced the guests to the assembly and invited Mr. Hudson to say a few words.

The function offered an excellent opportunity to make a presentation to Mr. L. W. Sanders upon relinquishing his duties as section secretary, a post he had held from 1949 to 1955. Handing to Mr. Sanders an engraved pewter tankard and a Dunhill pipe, MR. CATES reminded those present of the part played within the section and in liaison with the London branch by Mr. Sanders and said he hoped he would still remain a familiar figure at future meetings.

MR. SANDERS, replying, said that he accepted the secretary's duties for one year and found that it had extended to six. He always felt that this position could best be fulfilled by a member residing in Ipswich. In appointing Mr. Ward to this position, Mr. Sanders said the section's affairs were in the capable hands of a founder member of the section. He concluded by thanking his colleagues for the presentation and assuring all that he would remain keen in his attendance of the section's meeting. He also hoped that branch status would ultimately be reached in East Anglia.

The dinner was followed by excellent entertainment presented by the "Four Aces" concert party of Ipswich. Mr. L. A. S. Harbourne acted as M.C. for the evening and the function was organized by Mr. V. W. Child. At the conclusion, Mr. H. A. Wincer proposed a vote of thanks to the artistes and the organizer.

Australia (Victoria)

The September meeting of the Australian (Victoria) branch welcomed back Mr. P. M. Jurss, who participated in the London International Foundry Congress. He gave a talk covering the impressions he received of the Congress, and the foundry industry of both this country and America.

The October meeting was held in the Engineering School of the University of Melbourne, when Mr. Austin S. Beech, managing director of Foundry Equipment Limited, gave a paper on "Recent Developments in British Foundries; with Special Emphasis on Shell Moulding and Shell Coremaking."

New Catalogues

Vacuum Equipment. Edwards High Vacuum Limited, Manor Royal, Crawley, Sussex, have issued a number of leaflets to supplement their catalogue on vacuum equipment. Three of these (D.153/1, D.141/4 and D.111/2) deal with vacuum gauges; vacuum accessories are covered by reprintings of leaflets C.107/4, C.124/1, C.111/4 and C.100/5. Finally, vacuum coating units are the subject of leaflets E.108/4 and E.101/5, while E.144/2 gives information on accessories and H.106/2 on evaporation materials and recommended suppliers, for use when vacuum coating.

Repair and Joining of Aluminium Casting Alloys. The Sheffield Smelting Company Limited, Roydo Mill Street, Sheffield, 4, in section H.A.-2—a four-page leaflet—detail the use of two types of "Thesscal" solder and its flux. One of these hard solders (P.12) is stated to have a tensile strength of 19.4 tons per sq. in. Very clear instructions are given as to application of the material. A second pamphlet H.A.1 covers Thesscal "A" solder which can be used for joining aluminium to its alloys or dissimilar metals. In this case the tensile strength is quoted as 9.4 tons with five per cent. elongation. Again, clear instructions are given. These booklets are available on writing to Sheffield.

Comparative Study of Melting Furnaces Used in Iron Foundries*

Discussion of the Swiss Exchange Paper by Borut Marinček

The short discussion, which was all time allowed at the Congress for the above Paper, was in the main of a congratulatory or complementary nature. A speaker thought oil-fired furnaces also should have been considered and another queried the Author's interpretation of the rôle of oxygen in molten metal. A basic cupola/acid electric furnace duplexing plant was described. A final contribution postulated a solution—in terms related to speed of reaction—for the carbon/sulphur ratio when cupola melting. The Author's replies are briefly recorded.

During the proceedings of the International Foundry Congress in London last June the official Exchange Paper from the Swiss Foundrymen's Association, entitled "Comparative Study of Melting Furnaces Used in Iron Foundries," was presented by the Author, Mr. Borut Marinček. Mr. J. Blakiston, junior vice-president of the Institute of British Foundrymen, occupied the chair.

Cupola or Electric Furnace

MR. M. OLIVO (Italy), opening the discussion, said unfortunately there was not time to enter into detail of the very interesting Paper but he would like to point out that the question of the use of a cupola or an electric furnace or an induction furnace was a very broad one and a very old one, but at the same time it was often a question of locality. There were some places where the cupola could be used but the quality of the metal produced was not as high as it should be. Recently in the United States there had been an announcement that, notwithstanding the progress in electric furnace, the use of the cupola was increasing every day, and, particularly, a duplex method of operation was used whenever special iron had to be made.

Nowadays, with a hot-blast cupola it was possible to obtain results which some years ago it would have been impossible to foresee. He had worked with the cupola for 40 years and so could speak from experience; the weak point with the cupola had been that the results could never be relied upon. Now it was possible with the metallurgical hot-blast cupola to obtain results which, while not 100 per cent., were at any rate 95 per cent. certain, so that the possibility of using this type of furnace should be studied very closely in any case where a new installation had to be made.

MR. H. G. HALL said he disagreed, in a friendly way, with the Author, who had based his conclusions on the fact that the choice lay between a cupola and an electric furnace. That, in his opinion, was wrong. Had the Author forgotten that there was such a thing as a rotary furnace, because the speaker believed that from the point of view of fuel costs it was still possible to melt more cheaply in a rotary furnace than in the cupola or electric furnace?

He also disagreed with Table I which showed the operating characteristics of melting plants, because it seemed to create a false impression. The table showed coke ratios of 15 per cent. and 10 per cent. but after 2 years' experience it was his view that one should add about 2½ per cent. for wastage and the like. After all, it was the overall fuel cost which mattered.

With regard to electric furnaces, he doubted whether the Author could superheat metal by 100 deg. C. for 40 to 50 kwh per ton. In practice, as far as he could establish it, the figure was nearer 70 to 80 kwh per ton, and such facts made a considerable difference to the comparison between furnaces.

Mr. Hall said he also would have been extremely interested had the Author shown, side by side with Fig. 2 (which well illustrated the fact that it cost less and less to produce electricity), the *actual cost* of electricity to the consumer over the period years because it was his impression that as the efficiency was improved so the price to the consumer was increased.

A Duplexing Plant

A Member said members might be interested to hear of an installation with which he was concerned in France and which consisted of a basic cupola and an electric-arc furnace. The purpose was to make iron for centrifugally-cast cylinder-liners and for that kind of casting and operating conditions it was necessary to obtain high carbon and low sulphur contents. Three years ago, after having visited many plants in the United States, he had decided to install a small basic cupola and duplex from it with the existing acid-electric furnace. In the final analysis of the costs of the metal not only was the fuel consumption improved but the iron used was also improved, and by using the basic furnace one could melt 100 per cent. steel scrap, with return scrap, in the cupola and obtain very high carbon and very low sulphur contents in such a manner that a continuous melting rate could be obtained. If one took that iron and put it in the electric-arc furnace it could be superheated and any special elements might be added there. In a very short time it was possible to get a general analysis of the iron before casting. The latter was a factor which had not been mentioned by the Author and which was in fact very interesting.

* Paper printed in the JOURNAL, October 27, 1955.

Comparative Study of Melting Furnaces—Discussion

Quality Factors

MR. H. MORROGH suggested to the Author that there was one section of his Paper which detracted from its otherwise admirable practical merits and which could be very misleading. This was unfortunate, since it was a section which, in his opinion, was not very relevant to the subject under discussion. He referred in particular to the section headed "Factors which Influence the Quality of Liquid Iron." In this section Mr. Marincek had said that carbon and silicon might be oxidized to give respectively carbon monoxide and silica, and that the reaction could take place if oxygen was dissolved in the metal and it could be responsible for porosity in the castings. It would be interesting to know whether, in fact, there was any proof of this. In the laboratories of the British Cast Iron Research Association, the oxygen content of molten cast iron had been deliberately varied over the widest possible range by the treatment of the melt with various reactive oxides and also by bubbling oxygen through the melt, and that in carefully controlled experiments it had been impossible to demonstrate any effect on porosity. If there was any other evidence in support of Mr. Marincek's statement in the Paper it would be interesting to have it brought forward.

The Author had then proceeded to make what was really a very challenging statement, that the presence of oxygen in cast iron also raised the solubility of hydrogen and in support of this he had quoted the work of some Japanese investigators (S. Mazkawa, *Tetsu-To-Hagane*, **36**, 1950, p. 5-14). One needed to exercise some discretion in adopting these results. The oxygen results quoted in Mr. Marincek's Paper from the Japanese work, were extremely high; in fact, they were between two and one hundred times higher than any which he had been able to find in any commercial irons or in any cast irons to which oxygen had been deliberately added. His own results had been reported in a report submitted to the present Congress. The Japanese work had been quoted by Bastien ("Hydrogen in Cast Irons—a Comparison with Steel," *Proc.* International Foundry Congress, Paris, 1953), who had pointed out that such results were not very reliable or comparable because of the difference in analytical techniques used from those of other investigators. Recently, American investigators (R. C. Williams and H. W. Lownie) had shown that the oxygen content of grey cast iron increased rapidly on standing, and he could also confirm that before adopting from the literature any values for high oxygen contents in cast irons it was important to be certain that such determinations had been carried out on freshly-prepared samples, preferably chill-cast. If samples of grey cast iron had stood in the ordinary atmosphere, one found that both the oxygen content and the hydrogen content increased and he would suggest therefore that the results obtained on such samples had little bearing on the quality of the molten cast iron.

Furthermore, in the same section of the Paper, the author had said "Oxygen content, in addition, has an undesirable effect on the sulphur pick-up of cast iron during the melting process . . ." Said in that way it implied that oxygen in molten cast iron had this undesirable effect. Perhaps this was not what the Author intended, and he believed that he probably meant oxygen in slag or iron oxide in the slag in contact with the molten cast iron. If this were so, perhaps the Author would confirm it. On the other hand, if Mr. Marinček believed that oxygen in the molten cast iron influenced sulphur pick-up, it would be interesting to know on what experimental basis this was founded.

Mr. Morrogh added that, apart from this relatively unimportant section, he found the Paper a most interesting and valuable contribution to the literature.

Practical Generalities

MR. R. I. HIGGINS said he wished to draw attention to at least one feature which all the Papers which had been presented during that session of the Congress had in common, because an extremely important relationship had emerged which all the Authors had made use of. It was important in a practical connection. The general rule seemed to be that when one was considering cupola melting if one decreased the sulphur content of the iron one would increase the carbon content. The practical foundryman, of course, was very interested in that general relationship because it suggested to him that if he was trying to obtain a low-sulphur iron for some particular reason and did all the proper things to get it, he was going to finish up with a high-carbon iron, and the converse applied—if a high-carbon iron was required the sensible thing to do was to seek a low-sulphur iron. None of the authors had commented on that very important relationship and it might be that they had not done so because they could not see how that relationship could be derived from a study of the equilibria of the various reactions which were taking place. In other words it seemed that all the authors had been somewhat preoccupied with the thermodynamics of the system and had neglected the kinetics or the rate controlling factors of the reactions taking place. It was established that,† for pure iron/carbon/sulphur alloys, the rate of solution of carbon in such an alloy at any given temperature decreased as the sulphur content of the metal increased, and he would like to suggest, therefore, that the reason for the inverse relationship between carbon and sulphur that one obtained in cupola-melted material might be that the coke could dissolve more quickly in metal that had a low sulphur content and not that the coke was more soluble in the sense that the equilibrium concentration of carbon in the iron would be substantially greater at a low-sulphur content.

Author's Reply

MR. BORUT MARINCEK, in reply, said with regard to the choice between the cupola or the electric furnace that was largely an economic consideration. If electric power was cheap, then it was possible to obtain a very good result with the electric furnace.

† Spratt, D. A., and Kitchener, J. D. *Journal*, Iron and Steel Institute, **172**, Part 4, Dec. 1952, 384.

Mr. Hall had said he thought it impossible to superheat at a rate of 40 to 50 kwh per ton per 100 deg. C., but it was in fact possible in a large induction furnace of between 4 to 15 tons capacity to obtain very low values for kwh per ton.

Mr. Morrogh had raised the question of the relationship between oxygen and hydrogen content in cast iron, but the figure quoted by the Author had been used by Professor Bastien in a paper delivered in Paris two years ago dealing with the subject of hydrogen in cast iron.

On the motion of the CHAIRMAN (Mr. J. Blakiston) a hearty vote of thanks was accorded to Mr. Marincek for his excellent Paper. The oral session then terminated.

Author's Written Comment

On receiving notes of the Congress proceedings when his Paper was presented, the Author submitted the following additional comment:—

The oil-fired furnace had not been considered because it was very rarely used on the continent for melting of cast iron. In countries with favourable prices for oil, this furnace also had to be taken into consideration.

As far as the values of Table I were concerned, they should only be regarded as approximate figures; to give exact figures for the consumption would be very difficult because they depended on many factors —such as composition of charge, composition of molten cast iron, melting performances, etc. The current consumption for the superheating of one ton of liquid cast iron in the induction furnace and raising the temperature by 100 deg. C. is also only a reference figure. He confirmed, however, that this figure can be obtained in industrial practice with larger furnaces having correspondingly high electric efficiency.

Regarding Mr. Morrogh's remarks, he wrote that it could be observed at the blast furnace that pig-iron would solidify under a blister formation when the slag was black, *i.e.*, containing iron oxide (when working cold). Likewise, the pig-iron would have a lower silicon and carbon content and a higher sulphur content. This phenomenon disappeared when the iron oxide content of the slag was approximately of the normal concentration. Similar conditions existed, but less pronounced, in the cupola, especially when increased blowing caused an excess oxidation which was indicated by a higher ferrous-oxide content of the slag.

Widening the Scope of the BIF

Determination of the management of the British Industries Fair to broaden the scope of the BIF to increase its size and representation was referred to by the Chancellor of the Exchequer in accepting an invitation to perform the opening ceremony at Olympia next year. Mr. Butler added: "I commend this determination to those British industrialists who have not yet made up their minds to use the British Industries Fair as one of the instruments for increasing their export trade."

The ceremony, on April 23, will inaugurate the second BIF held in London in 1956. The first, at Earls Court, will be opened by Lady Eden on February 22.

There is already a "full house" at Earls Court, where more than 450 exhibitors will occupy the 250,000 sq. ft. of the ground floor. The British Toy Fair will be part of this early BIF—the first trade fair to be brought under its ægis.

One of the features of the Olympia BIF will be a display of electronic equipment within the new electrical section. According to Mr. Kenneth Horne, managing director of British Industries Fair, Limited, it is believed that this is the first attempt to bring purely electronic exhibits together to form a section in a British trade fair. The chemicals section is sponsored by the Association of British Chemical Manufacturers and will have a special layout covering the 32,000 sq. ft. of the National Hall ground floor. The Association will be holding a conference during the fair period. At Castle Bromwich, where the fair will run concurrently with the Olympia section from April 23 to May 4, engineering, electrical goods, building and heating, and hardware as usual will be exhibited.

THE ANNUAL CONFERENCE of the Combustion Engineering Association will be held at the Palace Hotel, Buxton, on December 8 and 9. Details are available from the director, 6, Duke Street, St. James's, London, S.W.1.

Steel Output at High Level

Steel production in October, the Iron and Steel Board announced on November 10, averaged 399,500 tons a week, compared with 374,500 tons a week in October last year. This represents an annual rate of 20,773,000 tons, which compares with 20,683,000 tons in September, and is only slightly below the record rate of 20,880,000 tons achieved in May.

Pig-iron production during the month averaged 249,200 tons a week, against 230,700 tons a week in the corresponding month of 1954.

The following table gives the latest steel and pig-iron output figures (in tons) and compares them with earlier returns and with the corresponding totals for the first 10 months of this year.

Period.	Pig-iron.		Steel ingots and castings.	
	Weekly average.	Annual date.	Weekly average.	Annual rate.
1955—July ..	230,800	12,000,000	307,700	16,002,000
August ..	236,200	12,282,000	345,100	17,946,000
September ..	246,200	12,804,000	397,800	20,683,000
October ..	249,200	12,957,000	399,500	20,773,000
First 10 months	237,400	12,343,000	377,200	19,615,000
1954—July	211,200	10,984,000	263,100	13,682,000
August ..	227,400	11,823,000	325,600	16,932,000
September ..	222,900	11,591,000	372,000	19,358,000
October ..	230,700	11,998,000	374,500	19,472,000
First 10 months	227,300	11,820,000	354,400	18,428,000

LONG SERVICE AWARDS were presented to two employees of Ley's Malleable Castings Company, Limited, Derby, and Ewart Chainbelt Company, Limited, Derby, by Mr. F. D. Ley, managing director of both firms. The recipients, Miss Ingram, forewoman of the core shop, with 50 years' service, and Miss M. Watts, chief cashier, also with 50 years' service, received a radiogram and television set, respectively.

Fund to Aid Science Teaching

Viewing with "growing disquiet the shortage of scientists, mathematicians, and technologists," several electrical, mechanical, and chemical engineering companies have combined to form a new trust, under the name of the Industrial Fund for the Advancement of Scientific Education in Schools. The sponsoring companies are directing their intentions to independent schools, and direct grant schools, which lack help from public funds and are often handicapped by absence of capital resources. Assistance will be given by providing capital grants towards the building, expansion, modernizing, and equipping of science buildings.

The companies taking part in the project are:—Associated Electrical Industries, Limited; British Insulated Callender's Cables, Limited; British Petroleum Company, Limited; British Portland Cement Manufacturers, Limited; Courtaulds, Limited; Distillers Company, Limited; English Electric Company, Limited; Esso Petroleum Company, Limited; General Electric Company, Limited; Arthur Guinness, Son & Company, Limited; Imperial Chemical Industries, Limited; Imperial Tobacco (Great Britain & Ireland) Company, Limited; Rolls-Royce, Limited; Shell Petroleum Company, Limited; Tube Investments, Limited; Vickers, Limited; and the Wellcome Foundation.

More than £1,500,000 for the fund has already been guaranteed and "it is believed that many other companies that depend on adequate supplies of pure and applied scientists and technologists may wish to add their support both in their own and the national interest," it was stated. Only shortage of time had prevented their being approached already.

An executive committee has been formed, with Sir Hugh Beaver, managing director of Arthur Guinness, Son & Company, as chairman, to adjudge and assess all applications. The committee will take into account both the volume and quality of the existing science teaching in any school as well as the nature of the proposals put forward to extend and improve it, and steps which the school has taken to help itself.

The other members of the executive committee are:—Sir Wilfrid Anson, chairman of the Imperial Tobacco Company; Mr. R. A. Banks, a director of ICI; Mr. E. H. O. Elkington, a managing director of British Petroleum; Dr. Willis Jackson, a director of the Metropolitan-Vickers Electrical Company; Mr. W. E. Jenkins, managing director of Esso; Prof. G. F. Mucklow, Professor of Mechanical Engineering at Birmingham University; Mr. J. A. Oriel, president of the Institution of Chemical Engineers; Dr. F. Roffey, a director of the Distillers Company; Dr. C. P. Snow, a director of English Electric; Prof. Sir Alexander Todd, chairman of the Advisory Council on Scientific Policy; Lt.-Gen. Sir Ronald Weeks, chairman of Vickers; Mr. A. H. Wilson, a managing director of Courtaulds.

The address of the fund is 20, Savile Row, London, W.1, and the committee's secretary is Mr. P. Ashton, of Courtaulds.

Recent Wills

HUGHES, JOHNSTON, shipyard manager of Harland & Wolff, Limited, Belfast, from 1894 to 1911 ... ... £46,168

BAMFORD, H. B. chairman of Bamfords, Limited, agricultural engineers, etc., of Uttoxeter (Staffs) ... £47,104

AMERY, L. S., MP for the Soarkbrook Division of Birmingham from 1911 to 1945, and formerly a director of Cammell Laird & Company, Limited, the Gloucester Railway Carriage & Wagon Company, Limited, and other companies £8,820

WILSON, H. A., a former member of the technical committee of the Chamber of Shipping, and a member of the Institution of Naval Architects, the Institute of Marine Engineers, and the Institution of Engineers and Shipbuilders in Scotland £1,867

Publications Received

La Fonderie Française (French Foundry Industry). Published by the Syndicat Général des Fondeurs de France et Industries Connexes, 2, rue de Bassano, Paris 16.

This is a particularly well produced 12-page brochure, designed to interest engineers in the potentialities of cast products. The opening page—printed on a shadow background of a modern foundry—pinpoints the advantages of castings for engineering components. On the next page this is amplified by pictorial references to quantity; weight and types of alloys. Following this, some details are given of the co-operative services given by the industry and where to get further information. A double-page pictorial spread is used to show on one half some of the major productions of the foundry, and the other half shows microstructures of cast irons, steel, light-alloy and copper-base castings. The central pages survey melting and heat-treatment facilities utilized by the industry. Continuing, moulding methods and quality control are given consideration, whilst finally, on a background of correlated graphs, the mechanical properties of all the alloys are briefly stated, plus on the last page a recapitulation. As a piece of propaganda for castings in general, the reviewer has never seen anything better.

Education and Training for Industrial Management, by Aubrey Silberston; published by Management Publications, Limited, 8, Hill Street, London, W.1. Price 12s. 6d.

This book somewhat resembles a vegetarian dinner. The opening sentences of chapter one read so awkwardly, that a determined effort has to be made to continue. Happily as the book progresses the style of writing improves. It is obvious that the author is "sold" on the idea that attendance at a course of management, education, and training is a worth-while objective. A young man sent by his firm to such an institution may very well imagine that he is not "making the grade" to use an Americanism, or if promotion is not immediately forthcoming, that he has been let down. The pleas for a post-graduate course on this subject do not appeal to the reviewer. The time taken up by a normal university course, plus military service, is such that, on its conclusion, the graduate should start working, for this practical experience will teach him more about the job of management than added "book learning." This is a book that cannot be recommended to either the student or an industrial executive, except as a directory to the various bodies giving attention to this subject.

Foundry Craftsmen—The Patternmaker (second edition). Issued by the Central Youth Employment Executive and published by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2, price 1s. net.

As these publications are often bought in bulk, it should be pointed out that the price for 50 copies is two pounds. As an introduction of the apprentice to patternmaking it is a well-illustrated, dignified booklet and is of the type likely to attract the more studious type of boy; it is this type of lad and this only—who is likely to make good in this fascinating and progressive trade. All master patternmakers should have a small stock in hand.

FROM DECEMBER 1, the National Aeronautical Establishment at Bedford will be known as the Royal Aircraft Establishment, Bedford.

New Equipment

Electric Hoist

Taylor Stoker Company, Limited, 189/191, Drummond Street, London, N.W.1, are introducing to British industry a complete new range of electric hoists, known as the Munck series, ranging from 2½ cwt. to 10 tons capacity. Of particular interest to founders is the fact that all models can be provided with a micro-speed motor to give a creeping speed in addition to the normal speed, when required. This feature is invaluable when shipping patterns from moulds. The creeping-speed device is also valuable in the machine shop, particularly when hoisting for setting up. Every size of hoist can be supplied either for fixed-point mounting, or with a trolley carriage to suit standard I-beams. The trolley may be arranged either for push, handchain or power travel, depending upon requirements. The Munck hoist is of all-steel construction, enclosed in a steel housing, with the motor automatically engaging or releasing the brake. The gearbox, brake and electrical contacts are all enclosed and a rope guide ensures that the rope winds correctly on the drum in spite of any carelessness on the part of the operator. The guide also actuates, automatically, a limit switch to prevent over-winding and over-lowering.

"Isotope" Insurance

The Alliance Assurance Company, Limited, reports that it has made a special study of the problems affecting research organizations and industrial users of radioactive isotopes with a view to providing any special insurances which may be needed. The special insurances at present contemplated do not extend to risks associated with nuclear reactors, however. The company is able to offer its connections a special advisory service in respect of "fire" and "loss of profits" insurances, where the safe use and storage of radioactive substances may be a factor in the time taken to extinguish a fire, or where an accident may occur resulting in an escape of radioactivity which may render an item of plant or a part of the premises unusable for a time, with consequent loss of profits. Likewise, special consideration has been given to problems associated with employers' liability and public liability insurances for firms and others engaging in research work necessitating the use of radioactive substances, and the company is able to advise on the precautions which should be taken for the safety of workers and others. A new form of "all risks" insurance is envisaged in respect of radioactive isotopes, their containers, and, in some cases, the devices enabling them to be used.

Trade Prospects with Austria

Opportunity was provided for trade between the United Kingdom and Austria such as had not existed for 15 years, declared Sir John Duncanson, leader of a delegation sent by the Federation of British Industries to Austria, commenting that industries held until recently by Russia were being integrated in the Austrian economic system.

Speaking in Vienna recently, Sir John said that the mission had been amazed by the extent of activities going on in Austria at present. The mission had made a particular study of the country's oil industry and of its requirements for equipment. He suggested that the British export industry might play a leading part in two new fields, that connected with the peaceful use of atomic energy and that of electronic computers in connection with automation in industry.

Apparatus Exhibition

For the laboratory man, one of the most interesting small exhibitions of recent years was that held from November 1 to 11 by the Shandon Scientific Company, Limited, at 6, Cromwell Place, London, S.W.7. Here was gathered together the "cream" of equipment which the firm handles in serving general and metallurgical laboratories, about 50 per cent. being of the firm's own manufacture and much of the balance imported.

Over 100 pieces of apparatus were on show in four rooms. In room A were microscopes for transmitted and incident light; microtomes; other optical instruments and precision balances. In room B were an electric mortar grinder; gas indicators and detectors, and specialized equipment for the preparation of metallurgical specimens. Room C contained biochemistry equipment; a chromatography section and apparatus for electrophoresis; a flame photometer and Warburg apparatus. Finally, room D was devoted to general laboratory aids including constant temperature heating and cooling devices and apparatus for the analysis of gases in metals.

A fair proportion of the equipment exhibited was of direct interest to foundry technicians. One such item was direct-reading apparatus for estimating moisture in powders, where an infra-red heat-source was concentrated on a sample of the material lying on a balance pan. The gas-analysis section and that for volumetric carbon and sulphur demonstrations were most impressive. The extensive show of equipment for the preparation of metallographic specimens included mounting presses, polishing papers, cloths and machines, cut-off devices for sampling, and the like. Taken as a whole, the show was an impressive demonstration of progress made in post-war years in laboratory technology.

Parliamentary

Clean Air Bill

Emission of dark smoke from chimneys, railway engines, and vessels was prohibited by the Clean Air Bill, and it was because the provisions would involve improvement and alteration to many industrial plants that the Beaver Committee had recommended a seven-year period of grace in which to effect the necessary work, said MR. W. F. DEEDES, Parliamentary Secretary to the Ministry of Housing and Local Government, when he moved the second reading of the Bill.

He pointed out that it was made obligatory for all to use such means as were practicable to minimize the emission of grit and dust, but they had to recognize that effective action would not always be practicable. It called for special plant, which for small works might present considerable difficulties. The Bill ensured, however, that large furnaces to be installed in the future which were likely to emit large quantities of grit and dust must be equipped with efficient arrestment equipment.

Mr. Deedes said that the prevention of domestic smoke would be a major operation involving radical changes in fuel use, problems of supply, and large-scale alterations in domestic appliances, as well as a great deal of public willingness. The Government proposed this operation should be carried through by the gradual extension of smoke-controlled areas similar to the smokeless zones already established.

Imports and Exports of Iron and Steel in September

The following tables, based on Board of Trade returns, gives figures of imports and exports of iron and steel in September. Totals for the first nine months of this year and last are also included.

Exports of Iron and Steel

Destination.	Month ended Sept. 30.	Nine months ended September 30.	
	1955.	1954.	1955.
	Tons.	Tons.	Tons.
Channel Islands	398	3,530	4,567
Cyprus	147	5,286	3,355
Sierra Leone	346	8,241	5,970
Gold Coast	1,624	25,966	17,589
Nigeria	3,341	44,008	35,811
Union of South Africa	6,213	35,018	50,708
Rhodesia and Nyasaland	3,975	43,301	49,135
Tanganyika	1,561	17,583	12,735
Kenya	2,575	50,167	34,853
Uganda	435	3,894	3,293
Mauritius	271	4,413	1,870
Bahrain, Qatar, and Trucial Oman	166	16,460	7,926
Kuwait	7	4,684	1,939
India	15,310	70,038	95,945
Pakistan	3,183	44,270	31,043
Singapore	2,349	20,358	26,607
Malaya	2,727	17,273	17,883
Ceylon	1,578	14,656	12,341
British North Borneo	662	2,815	3,608
Hongkong	3,121	20,564	33,915
Australia	28,159	223,166	291,940
New Zealand	23,583	149,867	193,349
Canada	13,377	128,420	84,503
Jamaica	1,228	11,264	11,539
Trinidad	2,167	29,727	33,392
British Guiana	926	4,078	5,357
Anglo-Egyptian Sudan	1,131	24,833	12,279
Other Commonwealth countries	2,146	17,420	21,884
Eire	4,307	37,548	44,355
Finland	6,244	47,094	55,897
Sweden	10,839	52,752	99,905
Norway	5,822	56,913	82,484
Denmark	4,119	62,911	57,787
Western Germany	1,813	11,458	7,939
Netherlands	7,403	75,169	72,766
Belgium	1,628	7,916	15,769
France	388	3,575	4,426
Switzerland	928	7,362	10,662
Portugal	879	9,147	10,250
Spain	1,074	6,670	53,413
Italy	1,005	33,404	19,069
Austria	329	1,093	2,160
Yugoslavia	416	11,159	11,054
Turkey	381	7,644	6,785
Netherlands Antilles	586	2,478	9,024
Portuguese E. Africa	49	1,951	1,432
Lebanon	1,076	1,514	13,074
Israel	1,425	6,497	7,856
Egypt	531	19,824	16,286
Saudi Arabia	61	4,289	5,049
Iraq	507	20,995	32,423
Iran	13	4,287	44,373
Burma	334	7,854	8,392
Thailand	753	5,294	4,058
Indonesia	594	3,932	3,048
Philippine Republic	1,097	2,493	5,427
USA	8,420	30,739	37,128
Colombia	590	6,275	4,563
Venezuela	2,572	25,361	42,621
Ecuador	188	2,097	2,317
Peru	638	4,200	7,671
Chile	32	1,027	728
Uruguay	348	10,704	5,506
Argentina	1,821	46,746	40,807
Other foreign countries	2,974	51,952	36,556
TOTAL	194,890	1,733,624	1,988,396

WOLF ELECTRIC TOOLS, LIMITED, are supplying all the electric tools and associated accessories for the Trans-Antarctic Expedition. Since such machines must operate in extremely low temperatures they have been provided with special grease and lubricant which will not congeal at −40 deg. F.

Total Imports of Iron and Steel

From	Month ended Sept. 30.	Nine months ended September 30.	
	1955.	1954.	1955.
	Tons.	Tons.	Tons.
Australia	1	20,103	60
Canada	8,851	8,022	91,199
Other Commonwealth countries and Eire	1,617	4,846	24,295
Soviet Union	20,475	105,831	141,347
Sweden	2,473	29,625	23,614
Norway	7,515	23,268	57,705
Western Germany	11,549	40,916	43,076
Netherlands	14,728	73,136	122,726
Belgium	34,322	32,685	131,683
Luxembourg	4,528	14,912	28,079
France	48,565	49,046	182,695
Italy	198	7,473	1,293
Austria	9,493	137,806	90,305
Japan	2,256	55	21,039
USA	69,461	65,802	579,438
Other foreign countries	2,156	3,910	9,198
TOTAL	238,188	617,436	1,547,752
Iron and steel scrap and waste, fit only for the recovery of metal	106,064	583,737	939,027

Exports of Iron and Steel, by Product

Product.	Month ended Sept. 30.	Nine months ended September 30.	
	1955.	1954.	1955.
	* Tons.	Tons.	Tons.
Pig-iron	1,998	23,816	37,797
Ferro-columbium (niobium)*	4	—	49
Ferro-tungsten	176	361	402
Other ferro-alloys†	487	5,924	2,518
Ingots, blooms, billets, slabs, sheet, and tinplate bars	159	1,580	3,917
Iron bars, rods, angles, shapes, and sections	225	2,011	2,559
Steel bars, rods, angles, sections, and shapes	37,966	266,108	319,398
Iron plates and sheets	11	262	117
Universal plates	413	3,341	6,588
Steel plates, ¼ in. and under ⅜ in.	928	10,738	14,580
Do., ⅜ in. and over	15,448	109,741	194,142
Black sheets and black plate	15,638	146,950	163,226
Hoop and strip	8,298	81,582	79,119
Tinplate	22,988	225,263	237,400
Tinned sheets, terneplate, and ternesheets	212	1,642	2,113
Decorated tinplate	156	2,088	2,952
Galvanized sheets	* 11,982	124,748	122,178
Other coated plates and sheets	1,263	6,366	8,355
Railway and tramway construction material	15,247	170,183	192,648
Wire rods	2,483	22,598	21,654
Wire	8,036	66,311	71,991
Tubes, pipes and fittings	48,809	446,671	493,606
Iron castings	1,661	10,295	7,347
Steel castings	149	1,521	1,352
Forgings	253	3,524	2,388
TOTAL	194,890	1,733,624	1,988,396

* Not separately distinguished before 1955.
† The figures for 1955 are not completely comparable with those for previous years.

FORTH & CLYDE & SUNNYSIDE IRON COMPANIES, LIMITED, Camelon, Falkirk, are to erect a new vitreous enamelling shop at their works at an estimated cost of £11,500.

News in Brief

TOTAL membership of the Iron and Steel Institute has passed the 5,000 mark for the first time.

THE REGISTERED OFFICE of the Wagon Finance Corporation, Limited, is now at 3, Endcliffe Crescent, Sheffield, 10 (telephone: Sheffield 64466).

THIS YEAR the number of buyers visiting the *Exposition Internationale* at Charleroi, Belgium, rose to 120,600, representing 46 per cent. of the visitors total.

DAVID CAIRD, LIMITED, Furness Foundry, Barrow-in-Furness, Lancashire, has had plans approved for the erection of a foundry in Hindpool Road, Barrow-in-Furness.

SMEDLEY BROTHERS, LIMITED, of Eagle Ironworks, Belper, will celebrate its centenary with a dinner at Belper River Gardens Pavilion, on December 2. The firm was established in 1855.

THE COLLEGE OF PRODUCTION TECHNOLOGY, Charing, near Ashford, Kent, will hold evening courses on work-study at Birmingham, commencing January 11, and Sheffield, commencing December 6.

UNITED KINGDOM exports for October amounted to £268,100,000—13½ per cent. more than the monthly average for the first nine months of 1955. This is the highest monthly figure so far recorded.

GEORGE SALTER & COMPANY, LIMITED, ironfounders, spring and weighing machine manufacturers, High Street, West Bromwich, has submitted plans to erect extensions to the works in Spring Road, Smethwick.

THE COUNCIL of the Overall Manufacturers' Association of Great Britain has sent a five-point memorandum to the Chancellor of the Exchequer seeking the removal of purchase tax on industrial overalls imposed by the autumn Budget.

FAIRFIELD SHIPBUILDING & ENGINEERING COMPANY, LIMITED, Glasgow, are to build two turbine-driven oil tankers, each of 18,000 tons d.w., for Irish Shipping, Limited, Dublin. Delivery of the new vessels is expected in 1958-60.

THE HOME SECRETARY said he was prepared to accept the recommendations of the Working Party on the sale of old metals and the control of dealers in old metals, but he was unable to say when it would be possible to introduce the legislation necessary to implement them.

GUEST KEEN & NETTLEFOLDS, LIMITED, are establishing two scholarships for research in engineering and metallurgy, one at the University of Birmingham and the other at the University College of South Wales and Monmouthshire, Cardiff. Each scholarship is of an annual value of up to £400.

NUFFIELD METAL PRODUCTS, LIMITED, is transferring its patternshop and toolroom workers from the factory at Washwood Heath, Birmingham, to the Castle Bromwich works of Fisher & Ludlow, Limited, to permit greater efficiency, the management stated on November 4. No redundancy is expected as a result.

FESLENTE, LIMITED, a completely owned subsidiary of Foundry Equipment, Limited, is from December 1 to be jointly owned by British Industrial Sand, Limited, and Foundry Equipment, Limited. The precoated sand will continue to be made at Leighton Buzzard but research and development will be transferred to Redhill.

IT IS ANNOUNCED by Davey, Paxman & Company, Limited, Colchester, which is associated with Ruston & Hornsby, Limited, Lincoln, that British Railways has purchased a large "Fell" Diesel-mechanical, main-line locomotive. It is understood that this locomotive, No. 10100 is being put into public service on mixed-traffic duties.

NATIONAL TRADES' TECHNICAL SOCIETIES report a decline in the number taking their courses in Sheffield, from 1,100 before the war to less than half that figure in the present session. The decline is largely through younger men failing to take them up. Round-the-table discussions have been introduced and are proving popular.

PLANS to produce new grades of carbon black in the UK have been announced by Mr. Oscar Nelson, executive vice-president of the United Carbon Company, Charleston, West Virginia, USA. Additional plant is to be installed at the Swansea works of United Carbon Black, Limited, which for some time has been producing black under licence from the American company.

A SOLID SILVER MODEL of a Birmingham railway engine, the Zulu, made by Mr. Joseph Taylor, a local silversmith, 90 years ago, has been presented to Birmingham by one of his descendants, Mr. F. Taylor of Derby. It is to be preserved at the Birmingham Museum of Science and Industry as an example of the silversmith's art and craft. The engine is less than 2-in. long and is 1¼-in. high.

THE DARCAST NEWS SHEET, issued by Dartmouth Auto Castings, Limited, Smethwick, announces that this November marks the start of round-the-clock operation, with the mechanized plant operating 16 hours per day Mondays-Thursdays, and 24 hours continuously on Fridays. Moreover, in the New Year, more capacity will be available by the advent of an entirely new foundry unit served by an automatic mould producer.

A NEW OIL-FIRED TILTING FURNACE was started at the works of D. H. Farley, nickel-silver manufacturers, Union Lane, Sheffield, on November 17. The firm makes nickel-silver for the spoon and fork trade and is an associate company of B. & J. Sippel, Limited, and the lever to declare the new furnace open was operated by Mrs. A. E. Sippel. The new furnace replaces 10 crucible melting furnaces, and doubles the output.

MR. PAUL TAYLOR, head of John Taylor & Company, bellfounders, of Loughborough, recently gave a talk to Derby Rotarians on bells. He explained how they were manufactured, and said the cost of a 15-ton bell at the present time would be probably £20,000. In speaking of the history of the firm, he said it had been carried on by various owners since about the fourteenth century, and had been engaged in the bell-foundry industry for nearly 200 years.

BACK AGAIN in the works in which it was built 40 years ago is a 1,000-kw. Brush Ljungstrom turbo-alternator set which the Brush Electrical Engineering Company, Limited, installed at Loughborough power station in 1915. It was formally handed back to the manufacturers by Mr. F. Favell, chief generation engineer of the East Midlands Division of the Central Electricity Authority, at the Brush works at Loughborough on November 15.

SCAFFOLD UNITS, shuttering, and other equipment used in building construction and manufactured by Acrow (Engineers), Limited, London, W.2, are now being made to metric standards. The company states that it has been found that Continental contractors using Acrow equipment for overseas projects are swinging away from the use of feet and inches to metric measurements. This step has been taken to avoid any diminishing of export orders because of lack of conformity with local standards of measurement.

News in Brief

A CONFERENCE is to be held at Dunblane Hydro Hotel on December 10 to 11, on "Development and Application of Automatic Processes." It is to be sponsored by the research and development committee of the FBI Scottish Council in collaboration with the Scottish branch of the Institution of Production Engineers. Invitations have been received by managing directors of 750 Scottish firms and 350 Scottish members of the Institution.

THE FOURTH BRITISH PLASTICS EXHIBITION AND CONVENTION—occupying more than double its previous amount of floor space—will be held in the Grand Hall, Olympia, London, from July 10 to 20, 1957. The convention, which will be international in character, will run concurrently. This exhibition which, until now, has shown only the materials, plant and products of the United Kingdom and British Commonwealth, is being enlarged and extended and will include exhibits from other countries.

NEARLY £500,000 is to be spent in the next 15 months in improvements to the Leamington works of the Imperial Foundry Company. Corrugated iron workshops, first erected 200 years ago, are to be demolished and replaced with premises of modern design. New machinery valued at £160,000 is to be installed, and special welfare facilities for employees provided. A four-storey cooling tower is to be erected at a cost of £100,000 and the east wall of the foundry altered to provide improved ventilation and lighting. Imperial Foundry produces 200 tons of castings daily.

THE Association of British Chambers of Commerce—representing 100 chambers of commerce in the UK—has sent a memorandum to the President of the Board of Trade urging the Government to amend the Monopolies and Restrictive Practices Act, 1948, to make it applicable "to all engaged in trade and industry, both ownership and labour." The memorandum suggests that widespread registration of agreements and practices is both unnecessary and undesirable, and instead it proposes a system of "applicant *versus* objector" with a judicial tribunal as arbiters and the Government's law officers holding "intervening" briefs.

AT THE MEETING of the Midlands Region of the Engineering Industries Association, held in Birmingham on November 17, members, who are increasingly concerned at the shortage of steel supplies, reported specific difficulties which their firms have experienced in obtaining steel of the grades and sizes they need. In a letter to members, the regional chairman, Mr. Arthur Keats, acknowledged the reports of growing supply difficulties, but said more factual information was required by the Association before it could take official action. The possibility of making representations to both the Board of Trade and the British Iron and Steel Federation was in mind.

EMPLOYEES of F. H. Lloyd & Company, Limited, Wednesbury, were told by their chairman and managing director, Mr. F. N. Lloyd, recently, that the problem of production and recruiting at the works was very serious. He appealed to his employees to ask anyone they knew who wanted a permanent job, whether skilled, semi-skilled or unskilled, to call at the factory. They could always be taught a higher degree of efficiency and responsibility, he said. Mr. Lloyd, who was speaking at a long-service presentation to 35 employees, disclosed that with the two associated companies at Burton and Derby, the firm had 257 long-service workers.

FROM JANUARY 1 Vickers-Armstrongs (Shipbuilders), Limited, is to take over the shiprepairing, constructional engineering, and galvanizing business at Hebburn and Jarrow of Palmers Hebburn Company, Limited, another member of the Vickers group of companies. This acquisition continues the policy of consolidation of the shipbuilding and other allied businesses of the group. Mr. E. L. Champness, managing director of Palmers Hebburn, will retire at the end of this year at his own request. The plants at Hebburn and Jarrow will be known after the end of this year as the Palmers Hebburn Works of Vickers-Armstrongs (Shipbuilders), Limited.

A NEW-STYLE fuel-economy appeal to Midland industrialists was launched in Birmingham on November 15, by the Minister of Fuel and Power, Mr. Geoffrey Lloyd, making the first of a series of visits to regional centres to call for a 2,000,000-ton cut in industry's coal consumption this winter. Meeting the Midland Regional Board for Industry, Mr. Lloyd said that he was aiming direct at the managing director. It was essential that the drive should come from top management if results were to be achieved quickly. The Board is to address a special appeal to managers of 2,500 Midland firms that have not yet taken advantage of the facilities offered by the National Industrial Fuel Efficiency Service. The Minister said that coal stocks, at 19,300,000 tons, were better than they were at this time last year and were still rising. They had been built up mainly by imports, however, and at a high cost in foreign exchange—£80,000,000, about half of it in dollars. Progress in the substitution of oil for coal was encouraging.

THE SUCCESS IN CANADA of the products of Newman, Hender & Company, Limited, Woodchester, Glos, has been such as to justify the incorporation of a Canadian subsidiary company, under the name, Newman, Hender (Canada), Limited. The new company will further develop the distribution, servicing and stocking of Newman, Hender products in Mid-western Canada, and provide an expert, practical and technical service in valves and their applications. It will further act as agents and stockists for ancillary products like steel flanges and welded fittings, as formerly distributed by Francis Caird, Limited, of London and Toronto. The chairman of the new company's board is Mr. H. W. Francis. The other members are Mr. N. P. Newman, Mr. F. R. Newman, Mr. A. G. Burton and Mr. F. H. Caird. Mr. C. V. H. Bryan is the vice-president and general manager of the company. Administration centres on 28, Hollingsworth Buildings, Calgary. The first warehouse is at Calgary. It is the forerunner of others to be established in various centres in the middle West.

Recent Wills

PRICE, I. P., managing director of David Willetts, Limited, chainmakers, etc., of Cradley Heath (Staffs) £8,465

PAGET, FREEMAN, head of Smith & Paget, Limited, laundry and agricultural machinery makers, of Keighley £30,443

ROUSE, HERBERT, a local director and sales director of William Jessop & Sons, Limited, steelmakers, of Sheffield £9,875

PARSONS, H. K., managing director of Gent & Company, Limited, manufacturing electrical engineers, of Leicester £70,946

GREENWOOD, J., W., formerly traffic manager of Thomas Firth & John Brown, Limited, steelmakers, of Sheffield £3,441

YATES, H. J., founder and first chairman of Radiation, Limited, manufacturers of solid-fuel and gas appliances, of London, W.1 ... ... £73,310

Personal

THE new appointment of general manager, industrial fuels, of Shell-Mex & B.P., Limited, has been filled by Mr. H. CUNLIFFE.

Mr. C. G. MACKIE has been elected a director of the Stanton Ironworks Company, Limited, and has been appointed general commercial manager of the Stanton group from January 1, 1956.

Mr. EDWARD J. WOODHEAD has been appointed assistant export sales manager of James A. Jobling & Company, Limited, makers of scientific glassware, etc., of Newcastle-upon-Tyne.

THE MANAGER of the Cleveland Works of Dorman, Long & Company, Limited, Middlesbrough, Mr. H. H. UTLEY, has been installed president of the Cleveland Institution of Engineers.

Mr. GEORGE CUTHBERTSON, alloy shop foreman of Henry Balfour & Company, Limited, Leven, has been presented with a set of bowls from the management and staff on his retirement after more than 25 years with the firm.

JOHN M. MOORWOOD, LIMITED, roll manufacturers, of Sheffield, has appointed Dr. R. H. HICKLEY as metallurgist in charge of research and development. Dr. Hickley joined the executive staff of the company early this year.

Mr. JOSEPH SMITH, of Quinton, has retired from the position of managing director of Edwin Danks & Company (Oldbury), Limited, to become deputy chairman of the company. Mr. L. W. H. REA has succeeded Mr. Smith as managing director.

BRITISH TRANSPORT COMMISSION announce that Mr. JAMES NESS, at present acting general manager, has been appointed general manager of the Scottish Region of British Railways with effect from November 21, in succession to the late Mr. A. E. H. BROWN.

Mr. R. F. LANSDOWN, at present mechanization engineer in the East Midlands Division of the National Coal Board, has been appointed chief mechanization engineer in the NCB's production department at national headquarters. He succeeds Mr. I. G. E. LEEK, who left the board's service to take up a private appointment.

Miss EDITH M. BEATTLE, who held the position of chief wages clerk at Ley's Malleable Castings Company, Limited, Derby, has retired after 53 years' service with the firm. As a momento of the occasion she was presented with a chiming clock and a portable radio by Major Francis D. Ley, managing director of the firm.

Mr. J. R. BOTTOMLEY and Mr. J. F., WALLACE have been appointed local directors of William Jessop & Sons, Limited, steel manufacturers, Brightside Works, Sheffield. Mr. Bottomley is chief engineer to the company which he joined in 1946, and Mr. Wallace, who has been with the firm since 1934, was recently appointed sales director.

TO COMMEMORATE the 60 years' service of Mr. GEORGE W. BUSH, sales manager for the past 18 years of the Mint, Birmingham, Limited, the company held a dinner in his honour on November 18, when Mr. E. S. Little, a director, presented him with an autograph book and a cheque. Mr. Bush celebrated his 75th birthday on November 19.

Mr. J. T. ROWLEY, secretary of J. & H. McLaren, Limited, manufacturers of oil engines, and a subsidiary of the Brush Group, Limited, is to retire from that post at the end of the year in order to take up an appointment outside the group. He will be succeeded by Mr. D. G. A. OWEN, at present personal assistant to the controller of accounts of the Brush group.

Mr. K. O. BOARDMAN, chairman of Baerlein Brothers, textile and machinery merchants, a subsidiary of the Leigh Manufacturing (Holdings), has assumed the office of managing director following the resignation of Mr. D. W. H. GALBRAITH. Mr. E. T. WIDOWS, Mr. E. C. SMITH, and Mr. G. F. PARKINSON have been appointed additional directors.

Mr. JOHN JACKSON has been appointed assistant manager of the Clay Cross Company, Limited, Chesterfield. He is the younger son of Col. H. Jackson, joint managing director of the firm, and his appointment marks the fifth generation of the family to take over executive status and maintain a direct unbroken line since Sir William Jackson was associated with George Stephenson in the foundation of the company in 1837.

Professor N. S. BOULTON, newly-appointed head of the Department of Civil Engineering at Sheffield University, gave his inaugural lecture in the lecture hall of the new engineering block at Brookhill, Sheffield, on November 11. Professor Boulton, who was previously senior lecturer in civil engineering, took as his subject, "Civil Engineering as a University Subject." He traced the history of civil engineering from its beginnings in the mid-eighteenth century, and discussed the subjects needed by student-engineers.

Mr. ASHLEY S. WARD, a former Master Cutler, president of Thos. W. Ward, Limited, and deputy chairman of Laycock Engineering, Limited, Millhouses, Sheffield, was one of three new members admitted to the "25" Club of Laycock Engineering, Limited, at their eighth annual meeting and dinner at the Grand Hotel, Sheffield, on November 15. Mr. Ward, now 77 years old, was responsible for the revival of the firm 25 years ago. About 200 people were present at the dinner of the Club of which all members have 25 years or more service with the firm.

Dr. G. L. J. BAILEY has been appointed superintendent of the Platinum Research Laboratory in the development and research department of the Mond Nickel Company, Limited, at Acton, London, N.W.10, in succession to Dr. E. C. RHODES. Dr. Bailey will take up his new duties on February 1, 1956. He joined the staff of the Admiralty Engineering Laboratory at West Drayton in 1939, and in 1945 he went to the British Non-Ferrous Metals Research Association, where he is now deputy research manager. Mr. E. J. BRADBURY has been appointed assistant superintendent of the Development and Research Department Laboratory of the company in Birmingham.

Obituary

THE DEATH HAS OCCURRED of Mr. MALCOLM ROBERT MELDRUM, who, until his retirement in 1945, was in charge of sales promotion and publicity work at Herbert Morris, Limited, of Loughborough.

Mr. BERNARD E. HUNT, formerly joint managing director of the Chillington Tool Company, Limited, Wolverhampton, died on November 14, at the age of 68. The firm was founded by his uncle Mr. J. W. Hunt and Mr. Bernard Hunt joined it from school, becoming a director, and joint managing director in 1922.

Mr. ROBERT LOCKHART HAMILTON, who was managing director of the National Steel Foundry, Leven, for 18 years, has died in Edinburgh after a short illness at the age of 58. A native of Manchester, he joined the foundry as a draughtsman in 1916 and was promoted machineshop superintendent. Shortly afterwards he became production manager, then works manager, and finally managing director in 1937.

Raw Material Markets

Iron and Steel

Last month's rise of 3,000 tons in the average weekly output of pig-iron was encouraging, but expansion on a much more considerable scale is necessary to bring supply and demand into a state of equilibrium. There are, however, brighter hopes of the restoration of an economic balance. Additional blast-furnace capacity will soon be available and in anticipation of that event bigger stocks of raw materials are already in hand. Good supplies of basic iron are now reaching the steel-works and makers of No. 3 foundry iron are able to deal promptly with all specifications, but producers of hematite and low- and medium-phosphorus iron are working under constant pressure and users of these grades are driven to all sorts of expedients to make up their cupola mixtures.

The boom in the Continental steel markets and the rising trend of prices suggest that it may be difficult in the early months of next year to ensure continuity of large-scale shipments of steel semis from western Europe to British ports. However, at present the needs of the re-rolling mills are well covered, and full-scale activity is assured at least until the next holiday period. The smaller sizes of billets are less readily obtainable, but good supplies of the larger sizes and other forms of steel semis are coming forward both from home and overseas sources. Wire rods are still very scarce and high prices have been paid for marginal tonnages of foreign manufacture.

Reports of the trade in finished steel products are merely repetitive. Almost without exception the mills are working to capacity limits and rolling programmes are so extensive that it is difficult to fit in any more orders, even for standard sizes. Possibly the credit squeeze may halt the progress of capital investment projects, but the mills have an abundance of firm orders covering the period up to the end of June next. Moreover, overseas inquiries are circulating in undiminished volume and if more material can be released for shipment, a further expansion of exports will present no insuperable difficulties. Makers of steel pipes and railway equipment view the outlook with the utmost confidence, while the volume of business offered to the sheet mills and rollers of joists, sections, and plates far exceeds their capacity.

Non-ferrous Metals

The copper market is strong. The volume of metal changing hands is increasing and demand and the price are buoyant. Revised estimates as to Western European requirements in the months ahead are beginning to play an important rôle: without a clear settlement of labour difficulties in Chile and Rhodesia and in view of the fact that UK stocks are low, an expanding demand is foreshadowed.

In the United States the Business and Defence Services Administration has raised the percentage of mill space that must be made available to fill deliveries of many copper products for military and Atomic Energy Commission orders in the first quarter of 1956 from 8 per cent. to 9 per cent. It is estimated that reserves of copper-base products in the first quarter of next year will total 116,000,000 lb.

US Custom smelters are now asking and getting up to 46 cents per pound for December copper. Metal for January-February is, in fact, being quoted at 45½ cents, and it is understood that dealers are obtaining nearly 47 cents for copper in the first quarter of 1956. Nevertheless, the producers have kept their price at the 43-cent level.

The Chilean Copper Department has approved an agreement between its representatives in New York and the Anaconda Copper Company for regular sales of copper to Europe from the Chuquicamata and Potrerillos plants. The sales will in future be effected through a permanent contract between the department and Anaconda, the aim of the agreement being to allow the department direct contact with its customers and to give it an accurate check on the amount of copper shipped to European markets.

Demand for tin is strong both in London and New York. Continued uneasiness about the Nigerian situation, dwindling tin stocks and authoritative warnings that Malayan tin ore reserves should not be regarded as bottomless have hoisted the quotation on both sides of the Atlantic.

Zinc remains steady. In the US the consumption outlook for the early part of next year is considered to be bright. Special high-grade metal is still tight and it would seem that producers are having to contend with the fact that zinc alloys are being used by certain galvanizers to overcome supply difficulties.

The call for lead also remains steady, with more buyers than sellers. The result is that the price continues to show small gains.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* November 17, £389 to £390; November 18, £383 to £384; November 21, £385 to £385 10s.; November 22, £380 to £380 10s.; November 23, £384 to £384 10s.

Three Months: November 17, £377 to £378; November 18, £371 10s. to £372; November 21, £373 to £374; November 22, £368 10s. to £369; November 23, £373 to £374.

TIN, Standard—*Cash:* November 17, £793 to £794; November 18, £791 to £792; November 21, £788 to £790; November 22, £789 to £790; November 23, £786 to £787.

Three Months: November 17, £770 to £771; November 18, £765 to £766; November 21, £764 to £765; November 22, £767 10s. to £768; November 23, £767 to £768.

LEAD—*Second half November:* November 17, £108 to £108 5s.; November 18, £107 15s. to £108; November 21, £107 17s. 6d. to £108; November 22, £108 5s. to £108 10s.; November 23, £110 to £110 5s.

Second half February: November 17, 107 10s. to £107 15s.; November 18, £107 10s. to £107 15s.; November 21, £107 12s. 6d. to £107 15s.; November 22, £108 to £108 5s.; November 23, £109 5s. to £109 10s.

ZINC—*Second half November:* November 17, £92 to £92 5s.; November 18, £92 to £92 5s.; November 21, £91 15s. to £92: November 22, £92 5s. to £92 10s.; November 23, £93 to £93 10s.

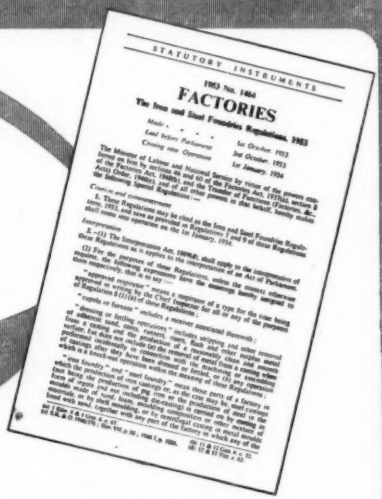
Second half February: November 17, £91 7s. 6d. to £91 10s.; November 18, £91 5s. to £91 10s.; November 21, £91 to £91 5s.; November 22, £91 10s. to £91 15s.; November 23, £91 10s. to £91 15s.

Latest Foundry Statistics

According to the Council of Ironfoundry Associations, 144,727 ironfoundry workers were employed in the United Kingdom during the week ending October 1, of whom 134,485 were males and 10,242 females. At this total, there were just over a thousand more than a month ago, and 4,553 more than a year ago.

WILLIAM JESSOP & SONS, LIMITED—Mr. J. R. Bottomley, chief engineer, and Mr. J. F. Wallace, sales director, have been appointed local directors.

for Foundry Floors and Gangways - Refractory Concrete is the Ideal Material


STATUTORY INSTRUMENTS

1953 No. 1464

FACTORIES

The Iron and Steel Foundries Regulations, 1953

The Iron and Steel Foundries Regulations 1953 say "Foundry gangways and Pouring Aisles shall have an even surface of hard material, and shall not have on them more sand than is necessary to avoid risk of flying metal from accidental spillage." The use of Refractory Concrete (made with Ciment Fondu and crushed firebricks or grog) will enable you to fulfil these conditions speedily, because Refractory Concrete . . .

. . . has a high cold strength and is ready for full use 24 hours after placing.

. . . will withstand repeated spillages of molten metals and direct contact of hot castings without spitting and blowing.

. . . needs no sand covering.

. . . is non-spalling under widest fluctuations of temperature and highly resistant to all forms of mechanical shock.

Photograph by courtesy of Globe Tank & Foundry (Wolverhampton) Ltd.

REFRACTORY CONCRETE

The Adaptable Refractory material made with crushed firebrick and

CIMENT FONDU
Royal Trade Mark
ALUMINOUS CEMENT

Concrete Rock-Hard within one day

LAFARGE ALUMINOUS CEMENT COMPANY LIMITED

73 BROOK STREET, LONDON, W.1. TELEPHONE: MAYFAIR 8546

★ *You are invited to write for further details and photographic examples.*

AP3/1303

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

November 23, 1955

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £17 1s. 0d.; Birmingham, £16 13s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £18 12s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £19 8s. 3d.

Scotch Iron.—No. 3 foundry, £19 5s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £21 3s. 0d.; South Zone, £21 5s. 0d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £22 0s. 0d.; South Zone, £22 3s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £19 5s.; Scotland (Scotch iron), £19 11s. 6d.; Sheffield, £20 12s. 0d.; Birmingham, £20 19s. 6d.; Wales (Welsh iron), £19 11s. 6d.

Basic Pig-iron.—£16 16s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £43 15s. 0d., scale 15s. per unit; 75 per cent. Si, £65 0s. 0d., scale 16s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 11s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £230 0s. 0d.; 38/40 per cent., £279 0s. 0d.

Ferro-tungsten.—80/85 per cent., 16s. 10d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 19s. 10d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent. C, £85 0s. 0d. to £90 0s. 0d., basis 60 per cent. Cr, scale 25s. 0d. to 30s. 0d. per unit; over 6 per cent. C, £82 0s. 0d. to £86 0s. 0d., basis 60 per cent. Cr, scale 24s. 0d. per unit; 2 per cent. C* 1s. 11½d. per lb. Cr.; 1 per cent. C,* 2s. 0½d. per lb. Cr; 0.15 per cent. C,* 2s. 2½d. per lb. Cr; 0.10 per cent. C,* 2s. 2¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 0d. to 7s. 6d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £249 0s. 0d.; 96/98 per cent., £269 0s. 0d.

Ferro-columbium.—60/75 per cent., Nb + Ta, 28s. per lb., Nb. + Ta.

Ferro-manganese (home).—78 per cent., £54 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £26 19s. 0d.; tested, 0.08 to 0.25 per cent. C, £27 19s. 0d.; hard (0.41 to 0.60 per cent. C), £29 5s. 6d.; silico-manganese, £36 7s. 6d.; free-cutting, £31 0s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £34 12s. 0d.; silico-manganese, £36 7s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £31 11s. 0d.; basic, hard, over 0.41 up to 0.60 per cent., C, £32 13s. 6d.; acid, up to 0.25 per cent. C, £35 12s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £33 1s. 6d.; boiler plates (N.-E. Coast), £35 11s. 6d.; floor plates (N.-E. Coast), £34 10s. 6d.; sectional material, N.-E. Coast, £30 19s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £33 19s. 6d.; flats, 5 in. wide and under, £33 19s. 6d.; hoop and strip, £35 1s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £36 5s. 0d.; black sheets (hand mill), 17/20 g., £46 13s. 6d.; galvanized corrugated sheets, 24 g., £58 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £58 0s. 3d.; nickel-chrome, £81 10s. 0d.; nickel-chrome-molybdenum, £92 7s. 6d.

NON-FERROUS METALS

Copper.—Cash, £384 0s. 0d. to £384 10s. 0d.; three months, £373 0s. 0d. to £374 0s. 0d.; settlement, £384 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 3s. 8¾d. per lb.; rods, 428s. 3d. per cwt. basis; 20 s.w.g., 461s. 6d. per cwt.

Tin.—Cash, £786 0s. 0d. to £787 0s. 0d.; three months, £767 0s. 0d. to £768 0s. 0d.; settlement, £787 0s. 0d.

Lead (Refined Pig).—Second half November, £110 0s. 0d. to £110 5s. 0d.; second half February, £109 5s. 0d. to £109 10s. 0d.

Zinc.—Second half November, £93 0s. 0d. to £93 10s 0d.; second half February, £91 10s. 0d. to £91 15s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £123 5s. 0d.; rolled zinc (boiler plates), all English destinations, £121 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £103 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 2s. 11⅛d. per lb.; rods, drawn, 3s. 8½d.; sheets to 10 w.g., 364s. 9d. per cwt.; wire, 3s. 6½d.; rolled metal, 350s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £226; B6 (85/15), —; BS249, —

Brass (High Tensile).—BS1400, HTB1 (30 tons), £296; HTB2 (38 tons), — HTB3; (48 tons), —.

Gunmetal.—RCH, 3/4 per cent. tin, —; BS1400, LG2 (85/5/5/5), £323; LG3 (86/7/5/2), £334; G1 (88/10/2/½), £400; (88/10/2/1), £390.

Phosphor Bronze.—BS1400, PB1 (AID released), £415 per ton.

Phosphor Bronze Strip, etc.—Strip, 514s. 0d. per cwt.; sheets to 10 w.g., 537s. 6d. per cwt.; wire, 5s. 2⅝d. per lb.; rods, 4s. 6¾d.; tubes, 4s. 5d.; chill cast bars: solids 4s. 7½d., cored 4s. 8½d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 4s. 5½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 9¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 8¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 4d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £90 10s. 0d. to £91 5s. 0d. Nickel, £519 0s. 0d. Aluminium, ingots, £171 0s. 0d.; aluminium bronze, (BS1400), AB1, £360; AB2, — Solder, brazing, BS1945, 3s. 1d. lb.; granulated, 3s. 4½d. lb.

* Average 68-70 per cent.